the OIL AND GAS JOURNAL

load masters
OF THE OIL FIELDS

Oil field service is a tough test for bearings. Heavy loads, severe shocks, continuous operation, high speeds all take their toll. That's why more Timken tapered roller bearings are used in oil field equipment than any others — and have been for many years.

Timken bearings keep rotating parts turning smoothly, frictionlessly because of their scientific design; precision manufacture; and extremely high finish of contacting surfaces.

They carry maximum loads — radial loads, thrust loads and both together in any combination because of their tapered construction and the line contact of rolls and races.

They last longer because they are made of Timken alloy steel — the finest material ever developed for tapered roller bearings — heat treated and case hardened to provide the greatest possible resistance to stress and wear.

The Timken bearings that go into your equipment today embody 50 years of continuous refinement. There is no substitute for this experience. Look for the trade-mark "TIMKEN" on every bearing.

THE TIMKEN ROLLER BEARING COMPANY
CANTON 6, OHIO
Cable Address "TIMROSCO"

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◎ AND THRUST →◎← LOADS OR ANY COMBINATION ✳

PRICE 50 CENTS

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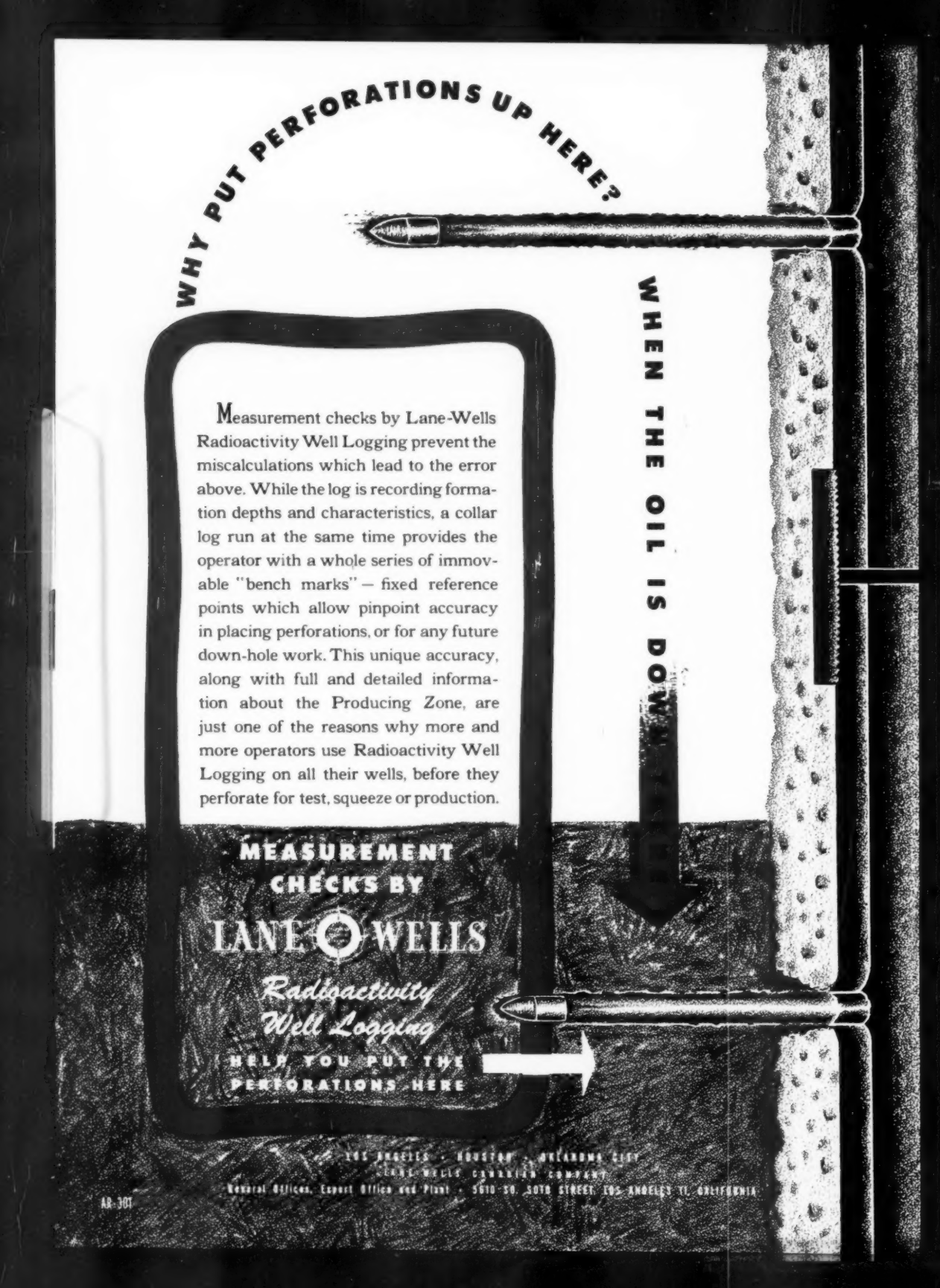
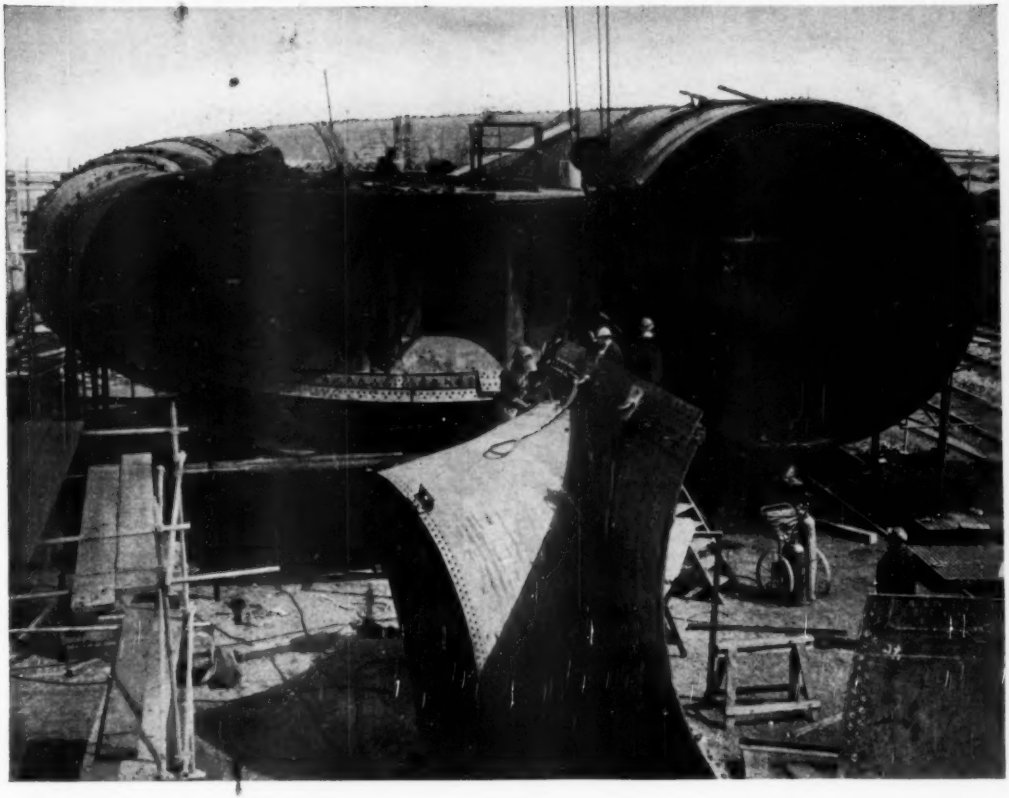
JANUARY 19, 1950


WHY PUT PERFORATIONS UP HERE?
WHEN THE OIL IS DOWN HERE
Measurement checks by Lane-Wells Radioactivity Well Logging prevent the miscalculations which lead to the error above. While the log is recording formation depths and characteristics, a collar log run at the same time provides the operator with a whole series of immovable "bench marks" — fixed reference points which allow pinpoint accuracy in placing perforations, or for any future down-hole work. This unique accuracy, along with full and detailed information about the Producing Zone, are just one of the reasons why more and more operators use Radioactivity Well Logging on all their wells, before they perforate for test, squeeze or production.
MEASUREMENT CHECKS BY
LANE WELLS
Radioactivity Well Logging
HELP YOU PUT THE PERFORATIONS HERE
LOS ANGELES · HOUSTON · OKLAHOMA CITY
LANE-WELLS CANADIAN COMPANY
General Offices, Export Office and Plant · 5610-30 SOUTH STREET, LOS ANGELES 11, CALIFORNIA
AR-307



200-Ton Turbine Casing

formed from steel plates

This steel shell is a scroll casing for the U. S. Bureau of Reclamation's new hydroelectric plant at Davis Dam on the Colorado River, where it will enclose one of the plant's five huge turbines. Through the 22-ft intake of the casing will pour the impounded waters of the Colorado, to turn the turbine shaft.

The casing consists of steel plates, varying in thickness from 5/8 in. to 1 in., formed to shape and riveted together. It weighs 200 tons, and measures approximately 65 ft across.

All five scroll casings for the plant at Davis Dam are being supplied by Bethlehem. This unusual job is representative of Bethlehem's ability to turn out steel-plate construction to meet any requirement. We are also supplying many types of steel-plate work for other fields, including such items as oil storage tanks, gas holders, pressure vessels, penstocks, large-diameter pipe, and tunnel linings.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

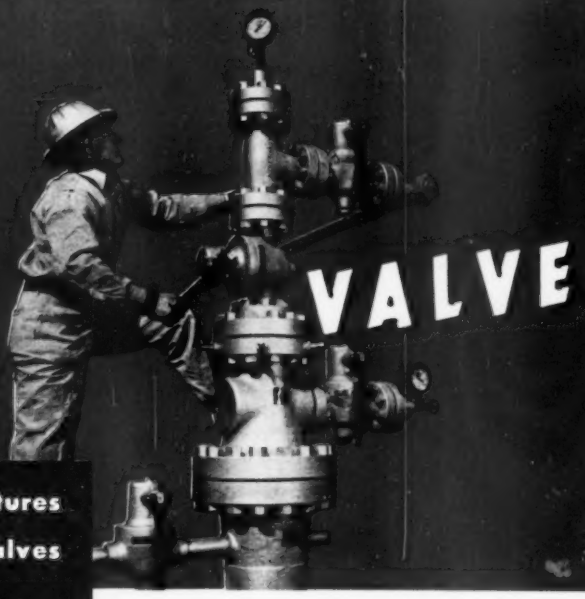
FABRICATED STEEL CONSTRUCTION

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1950.

THE NEW

Cameron

NON-LUBRICATED LIFT-PLUG VALVE



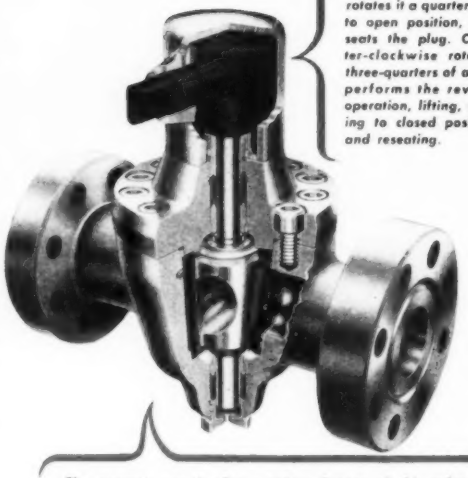
. . . combines the best features of gate, plug and globe valves with exclusive Cameron innovations

The Cameron Non-Lubricated Type "LP" (Lift-Plug) Valve presents a revolutionary approach to the problem of quality valve design.

Outstanding among the many mechanical improvements incorporated in this new valve is the fact that it does not require lubricant to effect a shut-off, whereas lubrication is essential to the operation of the usual plug valve and is generally incorporated as an improvement in gate valve design. The seat in the Cameron "LP" Valve is a separate member, a portion of its exterior surface being exposed to pressure, thus permitting a pressure sealing action against the plug. This feature eliminates many of the difficulties experienced with conventional designs where distortion of the body due to pressure, temperature, or line strains ordinarily causes imperfect sealing and makes lubrication a necessity. The unique lift-plug mechanism incorporated in the valve not only acts to eliminate the need for lubrication but makes possible an extraordinary ease of operation, since operating effort goes first into lifting the plug straight off the seat, then into turning it while free from contact with the seat, and, finally, reseating with rotation.

A descriptive bulletin will gladly be sent to interested operators upon request.

The plug actuator is an innovation in valve design. Rotating the operating shaft clockwise three-quarters of a turn first lifts the plug, then rotates it a quarter turn to open position, then seats the plug. Counter-clockwise rotation three-quarters of a turn performs the reverse operation, lifting, turning to closed position, and reseating.



The separate seat is also a unique feature of this valve. When seated, line pressure automatically tightens the seal because the pressure is outside a portion of the seat, forcing it into tighter contact with the plug. Being separate from the valve body, the seat, as well as the plug, may be easily replaced in the field.

Cameron

IRON WORKS, INC.

P. O. BOX 1212 HOUSTON, TEXAS

Export: 74 Trinity Place, New York, N. Y.

Can you guess which V belt will last 20 to 50% longer?

THE cross-section on the right is from an ordinary type of V belt; that on the left is from a B.F.Goodrich *grommet* V belt. Both belts are the same size — "E" sections. Both cost the same. Yet the BFG grommet belt may outlast the other from 20 to 50%! Here's why —

No cord ends — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends (as in an ordinary V-belt cord section), no stiff, weakened section of "spliced" cord. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B.F.Goodrich grommet V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. This eliminates "dishing" of cords in the center of the belt, insures full use of all cord strength, maximum power delivery, even load distribution. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

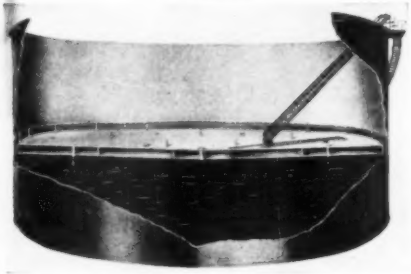
Better grip, less slip — Because a grommet is endless, free of stiff overlap, a grommet V belt is more flexible, grips the pulleys better. Size for size, grommet V belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B.F.Goodrich has the grommet! — Twin grommet construction is an exclusive, patented B.F.Goodrich feature — no other V belt is a grommet V belt. (U. S. Patent No. 2,233,294) To get genuine grommet V belts (at present made in D and E sections only) see your local B.F.Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. *The B.F.Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet V Belts BY

B.F.Goodrich

GRAVER FLOATING ROOF TANKS



Cut-away view showing details of Graver Double Deck construction.

• The Full Double Deck construction of the Graver Floating Roof effectively provides "profit protection" in both the production and finished product stages. It is especially recommended for its resistance to the corrosive action of "sour crude"...or for the storage of finished petroleum products in areas too isolated for practical manifolding...and where excessive differences in filling or withdrawal exist, as in a deep water terminal.

Fabricating the finest in *each* type of tank, Graver is in a position to determine which will best fit your particular situation and deliver maximum protection against vapor losses and corrosion. Take a look at the record of Graver Conservation Equipment...talk it over with Graver engineers. Prompt information and recommendations will answer your call, letter or wire.

GRAVER

FABRICATED PLATE DIVISION

GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, INDIANA

NEW YORK • PHILADELPHIA • CHICAGO • CATASAUQUA, PA. • HOUSTON • SAND SPRINGS, OKLA.

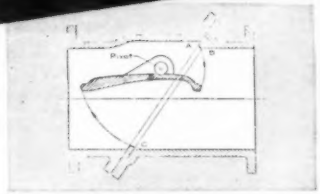
SAVE UP TO 80% IN HEAD LOSSES

with CHAPMAN TILTING-DISC CHECK VALVES

That's right! With Chapman Tilting-Disc Valves, head losses are 65% to 80% lower than for conventional type check valves.

But no wonder head losses are lower. Chapman Check Valves work with . . . not against . . . the stream. The balanced disc rides smoothly on the flow . . . lifts away easily in opening and closes quickly and quietly. There's no slamming to cause destructive pipe line stresses . . . minimum wear on seats, hinge pins and bearings.

All these features mean lower maintenance costs for you. So write *today* for additional information.



Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

The Chapman Valve Mfg. Co.
INDIAN ORCHARD, MASSACHUSETTS

These 7 Great Features Add Up To LONG V-BELT LIFE

1 *Powerful Cord Structure* built up of hard-twisted, high tensile strength cords, impregnated with live rubber compound to prevent chafing and heating.

2 *Thick, Resilient Cushion* of rubber supports cord structure at correct pitch line . . . absorbs shocks . . . helps dissipate heat.

3 *Tough, double-wrapped cover* of long staple fibres, bias cut for elasticity and impregnated with rubber. Protects cords . . . seals out dust, grit, moisture.

4 *Extra Stiffening Plies* of heavy fabric and rubber help keep the belt square in the groove.

5 *Precision Molded And Cured* in accurate steel dies. Gives belt the *straight* sides necessary to provide the bulging gripping action that all V-belts need.

6 *Every Belt Carefully Weighed* and inspected during construction. Assures perfect balance and uniformity.

7 *Accurate Set Matching* . . . Every finished belt measured while running under load. *Texrope* multiple V-belts are matched in sets to assure uniform load on each belt.

COMPLETE V-BELT SERVICE

Get everything you need for your V-belt drives . . . V-belts, standard and variable pitch sheaves and speed changers . . . from one reliable source. 144 page *Texrope* Pre-engineered Drive manual covers 90% of requirements. Get your copy today from your A-C Authorized Dealer or Sales Office or write for Bulletin 20B6956. Also in Sweet's.

ALLIS-CHALMERS, 1059A SO. 70 ST. MILWAUKEE, WIS.

Texrope and *Super-7* are Allis-Chalmers trademarks.

Super-7 *Texrope* V-Belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices. A-2836

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

ALLIS-CHALMERS

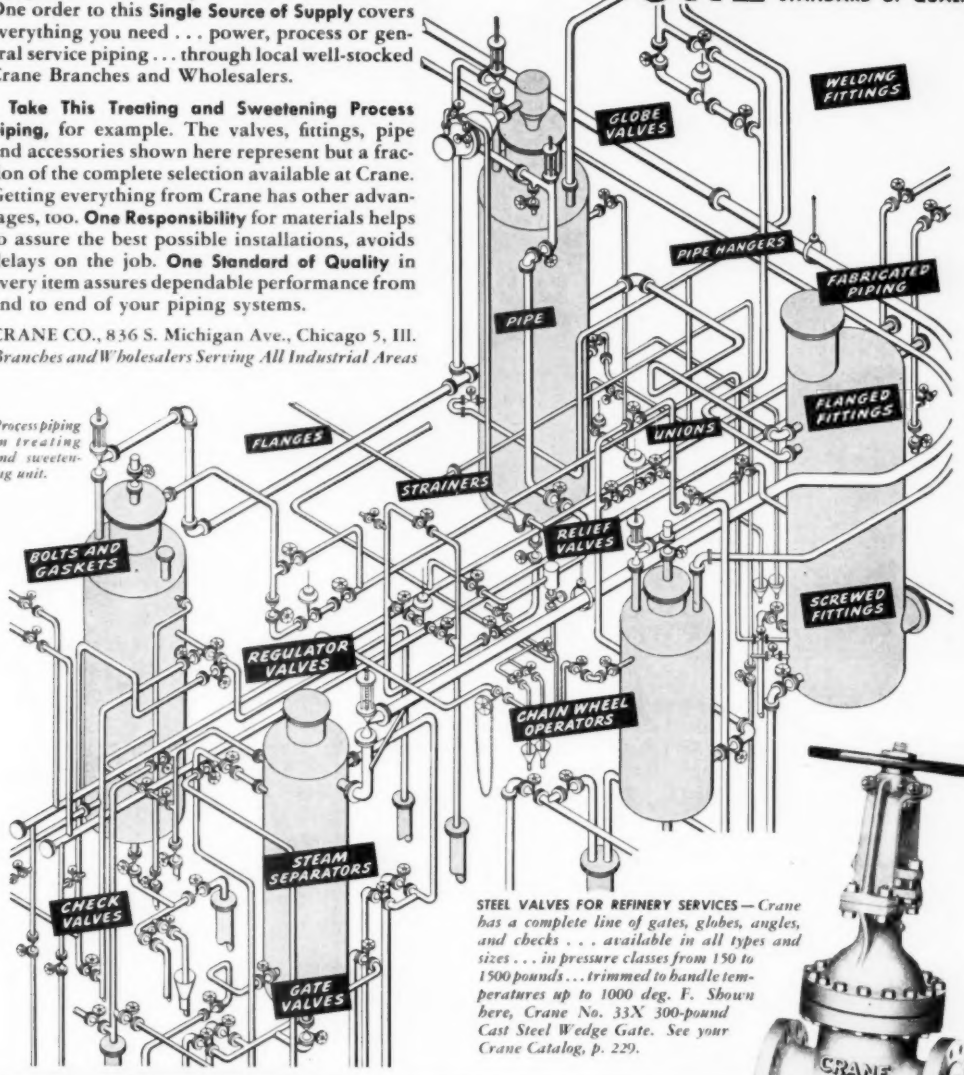
Look first to the CRANE line
For Every Piping Equipment Need

Look to Crane first . . . and save yourself the time and trouble of looking elsewhere. If it's piping equipment, most likely it's in the Crane line. One order to this **Single Source of Supply** covers everything you need . . . power, process or general service piping . . . through local well-stocked Crane Branches and Wholesalers.

Take This Treating and Sweetening Process Piping, for example. The valves, fittings, pipe and accessories shown here represent but a fraction of the complete selection available at Crane. Getting everything from Crane has other advantages, too. **One Responsibility** for materials helps to assure the best possible installations, avoids delays on the job. **One Standard of Quality** in every item assures dependable performance from end to end of your piping systems.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



Process piping on treating and sweetening unit.

STEEL VALVES FOR REFINERY SERVICES—*Crane has a complete line of gates, globes, angles, and checks . . . available in all types and sizes . . . in pressure classes from 150 to 1500 pounds . . . trimmed to handle temperatures up to 1000 deg. F. Shown here, Crane No. 33X 300-pound Cast Steel Wedge Gate. See your Crane Catalog, p. 229.*

EVERYTHING FROM . . .

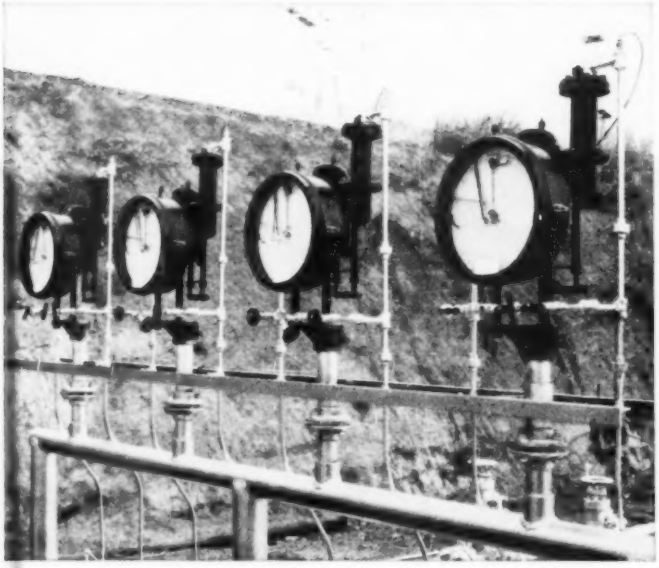
VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

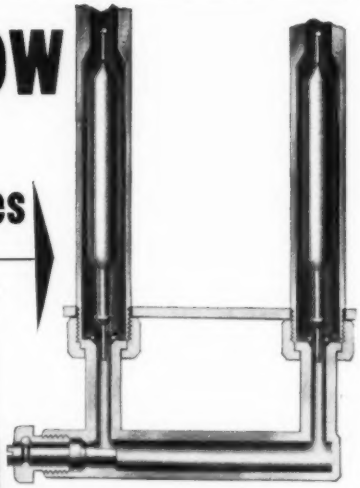
CRANE

FOR EVERY PIPING SYSTEM

MERCURY CAN'T BLOW

. . . when protected by these Mercury-submerged Check Valves





Blowing or emulsifying mercury is a needless waste. One blow can and often does shoot all the mercury in a meter . . . to say nothing of interrupting service, missing records and losing time to refill and recalibrate the meter. One large company reported a cost of $40 annually per meter for mercury-makeup, before changing to Foxboro Flow Meters.

The submerged check valves in every Foxboro Orifice Meter positively prevent mercury blowouts no matter how suddenly the meter may be overranged or by what cause . . . freezing, stoppage, leaks, faulty manipulation or flow reversal. They check blowing of mercury up to an overrange equivalent to the working pressure of the meter.

This performance has been so successful in eliminating trouble and expense in the gas field that most Flow Meters . . . for service requiring high and sustained accuracy . . . are by Foxboro.

When you specify Foxboro Flow Meters, you're sure of getting meters that offer the lowest cost in the long run. Now is a good time to be cashing in on them. Write for Bulletin 3 5 1. **The Foxboro Company, 60 Neponset Avenue, Foxboro, Massachusetts, U. S. A.**

6 OTHER REASONS FOR SPECIFYING FOXBORO FLOW METERS . . .

1. *Inherent accuracy*
2. *Freedom from mechanical errors and errors of angularity*
3. *Extra powerful float action*
4. *Practically frictionless movement*
5. *Simple, rugged construction*
6. *Ease of servicing*

. . . the results of exclusive design features plus 39 years of engineering "know-how".

FOXBORO
REG. U. S. PAT. OFF.

DIFFERENTIAL-TYPE FLOW METERS

CUT YOUR TANK VENTING costs

WITH THE NEW "VAREC" FIGURE 2000 CONSERVATION VENT VALVE

FEATURES

1. **Lightweight and Small** for low cost and easier handling.
2. **Venturi Inlet** for high flow capacity.
3. **Hyperbolic Pallets** for streamlined flow.
4. **Center and Side Pallet Guiding** — eliminates pallet sticking.
5. **Readily Accessible Pallets** through small top cover, no heavy deflector cover to remove.
6. **Valve Seats Regrindable** in place or easily removed.
7. **Easily Replaceable Valve Seats** — metal-to-metal or non-metallic.
8. **All Aluminum Construction** for H_2S corrosion resistance or semisteel construction as required.
9. **Standard Flange Connections** for flame arrester or tank nozzle.
10. **Emergency Flame Snuffer** if desired.
11. **Wide Range of Pressure and Vacuum Settings.**
12. **Complete Range of Sizes** from 2" to 12".

Now, "VAREC" offers you smaller and lighter vent valves that do a better job than larger heavier valves and cost less per thousand cubic feet of tank venting. These new lightweight, low cost Figure 2000 Vent Valves apply the proved theory that the incorporation of a venturi in the valve design greatly increases the flow. In fact, when mounted on a standard nipple, the flow exceeds that of the nipple alone. Certified flow curves are available.

This principle with regard to the design of vent valves was discussed in advertisements of the Vapor Recovery Systems Company several years ago. Further study resulted in the present design of the Figure 2000 Valve, utilizing hyperbolic pallets and the additional advantage of raising the venturi throat diameter further into the valve. This decreases overall valve size and weight without decreasing port diameter to a point where valve efficiency is materially affected.

PROVED and APPROVED "Varec"

We invite you to compare size for size valve flow under similar testing conditions and then compare weights and prices. Use the coupon to send for a copy of "Lowest Cost per 1,000 cu. ft. of Tank Venting."

THE VAPOR RECOVERY SYSTEMS COMPANY

NEW YORK • PITTSBURGH • CHICAGO • TULSA • HOUSTON
COMPTON, CALIFORNIA, U.S.A.

"Varec" CONSERVATION VENT VALVES and UNITS

P-13

THE VAPOR RECOVERY SYSTEMS CO.
COMPTON, CALIFORNIA
Dept. OGJ

Name _____ Title _____

Company _____

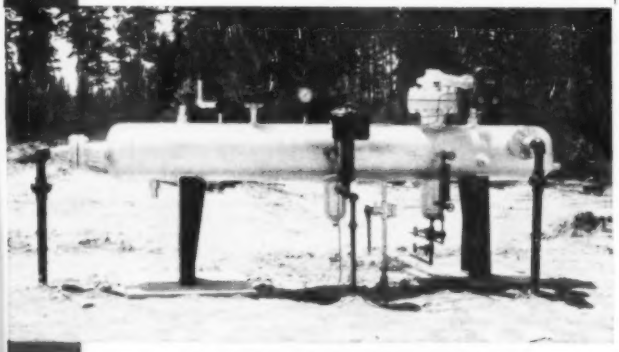
Street and No. _____

City and State _____

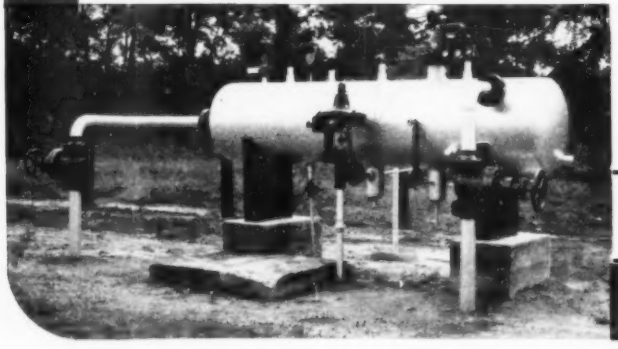
BS&B

Offers you two new REDUCE YOUR

Faster Separation, Thriftier Operation
. . . Handles More Gas, Easier Installation



HORIZONTAL SEPARATOR



• Yes, the new BS&B HORIZONTAL Separators bring one, two or three stage separation at a real saving! BS&B engineers have developed this new Separator with three thoughts in mind: faster flow, drier gas, higher gravity. Not intended as a replacement for vertical separators, the new Horizontal is meant to do its job where production requirements demand.

Built in a variety of sizes for different operating pressures, in the BS&B tradition of quality and top performance. They're meant to save money for you wherever they are put on the job!

Mail the Coupon

methods to PRODUCTION COSTS

STRIP YOUR OWN FUEL . . .

- **Employ Economical Gas Engines**
- **Eliminate Fuel Hauling**

with the

B S & B FUEL VAPORIZER

Now you no longer need employ costly Diesels. No more hauling fuel to the site. The Black, Sivalls & Bryson Fuel Vaporizer automatically strips the more volatile fractions from crude in sufficient quantity to fuel your engine. Complete, self-contained unit is ideal for service on the lease, or at pumping stations.

The Fuel Vaporizer is adjustable to your individual requirements. Taps off a small stream from the crude pump discharge, reduces its pressure, "tops off" a bit of gas in its own flash tower. Delivers fuel through a regulator to your engine fuel system. Cools crude and returns it to the pipeline. And the loss of crude gravity is so small it can hardly be measured!

Cut costs . . . use less-expensive gas engines. Avod fuel hauling to areas where natural gas is unavailable, or too costly. Send coupon today for the full story of the remarkable BS&B Fuel Vaporizer!

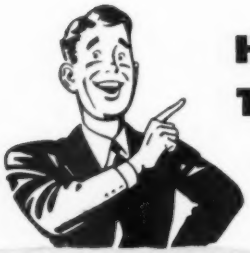
. . Get the Facts

BS&B

Oil Field Equipment Division, Section 21
BLACK, SIVALLS & BRYSON, INC.
720 Delaware St., Kansas City 6, Mo.

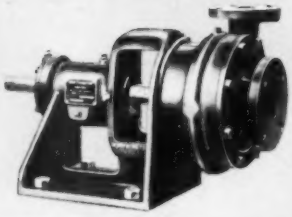
Send full details at once about ☐ BS&B Fuel Vaporizer ☐ BS&B Horizontal Separator. I am interested in ... bbls. separation at ... psi. ☐ Please have Sales Engineer call.

NAME
FIRM
STREET
CITY STATE

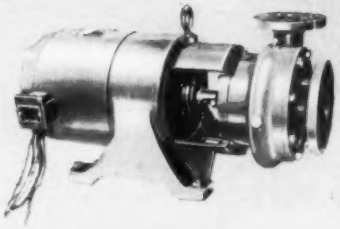


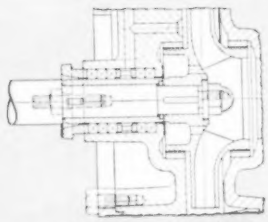
HERE'S PUMP-ENGINEERING THAT SAVES YOU MONEY!

Worthington Adapts The Same Basic Design To Different Needs

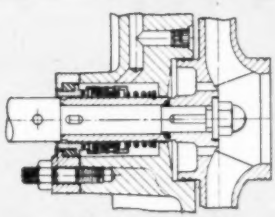


Worthington Centrifugal Pumps, Types CNE (frame-mounted) and DNE (Monobloc). Available in 36 sizes; capacities, 10 to 2,000 gpm; pressures 10 to 500 ft.





Conventional Packing



Mechanical Seal

FAVORITES in a wide range of oil industry uses, from the handling of fuel oil in bulk plants, trucks, and tank cars to circulating water for cooling engine-type compressors, these two Worthington Centrifugal Pumps are hydraulically identical. Type CNE, a frame-mounted pump, can be driven by electric motor or any other mechanical power-source. Type DNE is of balanced, compact Monobloc design with built-in explosion-proof motor, so essential in many petroleum applications.

The two types are so constructed that liquid ends are interchangeable, and packing can be either conventional or by mechanical seal. This is a two-way advantage: you can hook up the frame-mounted unit to your own power, or use the complete Monobloc unit. Whichever pump you select can be equipped either with a mechanical seal or conventional packing for gasoline, brine, caustic or water service.

THIS STANDARDIZING ON PUMP DESIGN is a Worthington specialty which results in streamlined manufacture, speedier delivery, more efficient, more economical pump performance and maintenance. How successfully it works out is shown by the vast numbers of Worthington Pumps now in use throughout the petroleum industry. Everywhere, every day, in oil fields and refineries, on pipe lines, loading and countless other duties you'll find these hard-working money-savers piling proof upon proof that *there's more worth in Worthington.* For further details, contact our nearest District Office or write to *Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.*

MEMBER

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

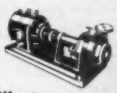
WORTHINGTON

CP-6

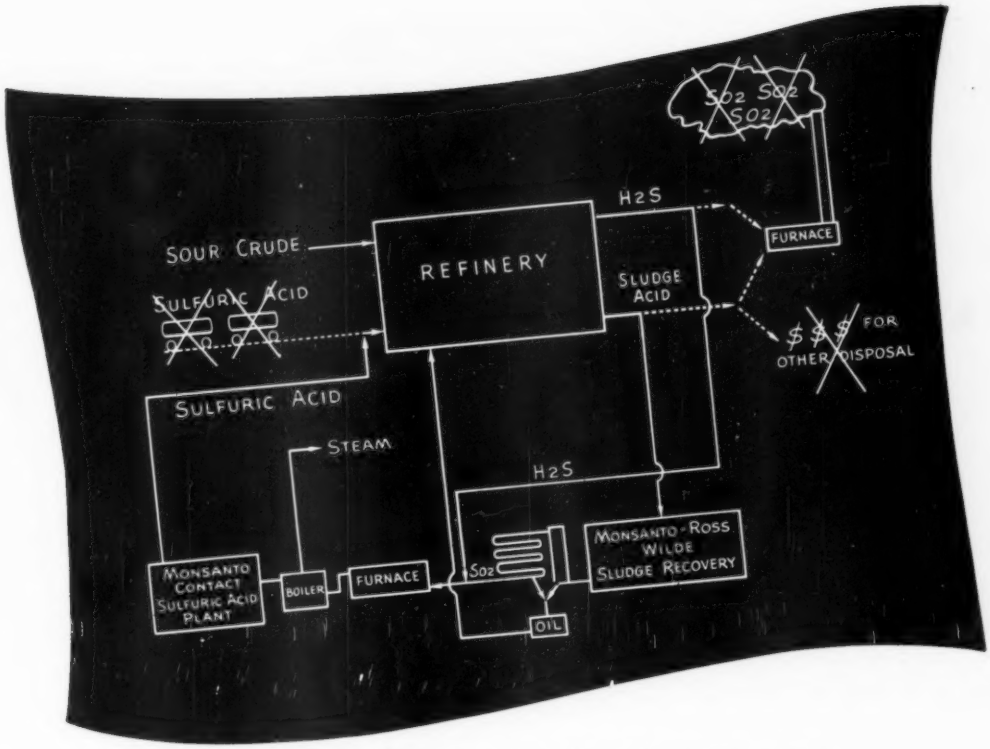
Types HR and HB. Twenty sizes. Capacities up to 1800 g.p.m. Developed heads up to 900 ft. Proper selection of material permits use for temperatures far below zero to 800°F., for pressures from high vacuum to 750 lb. per sq. in. gauge.

Type HD. Hydraulically-balanced, double-suction impeller handles boiling liquids with low submergence. Capacities range from 600 to 3200 g.p.m. at heads up to 700 ft., temperatures up to 850°F., pressures up to 550 lb.

Type WH. High-pressure, high-temperature, centrifugal hot-charge pumps. Twelve distinct points of superiority, based on years of experience building pumps for high pressures and temperatures. Capacities to 2000 g.p.m., heads to 5000 ft.



Type HL. Several construction arrangements permit flexibility in application. Designed for temperatures up to 225°F., or higher with water-jacketed stuffing box. Capacities up to 1600 g.p.m., heads to 500 ft.



How to change sludge acid into dollars

Monsanto now brings you a thoroughly-proved process for recovering oil and new, clean, high-grade sulfuric acid from sludge acid . . . and if you have H_2S, you can use it too. Thus, refinery wastes are *changed into dollars* . . . dollars added to the *profit end* of income.

The Monsanto process *saves dollars* now spent to dispose of sludge acid and H_2S . . . an important economy for many refineries. And it gives you a *plus value* in better community relations by eliminating pollution of the air and streams.

The process *earns dollars* by recovering oil which can be refined into salable products . . . by producing sulfuric acid needed for your refinery processes . . . by generating steam that can be employed in your operations.

Pull out the figures and see how much it's costing you to dispose of H_2S and sludge acid. Then, call in a Monsanto representative and see how economically you can install the Monsanto process to change these wastes into valuable products. You can get complete details, without cost or obligation, by mailing the coupon or contacting MONSANTO CHEMICAL COMPANY, Engineering Sales Department, 1745 South Second Street, St. Louis 4, Missouri.

MONSANTO
CHEMICALS — PLASTICS

MONSANTO CHEMICAL COMPANY
Engineering Sales Department
1745-L South Second Street, St. Louis 4, Missouri

Without cost or obligation to my company, please send your representative to discuss ways of changing sludge acid and H_2S into dollars.

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Company _____

Street _____

City _____ Zone ____ State _____

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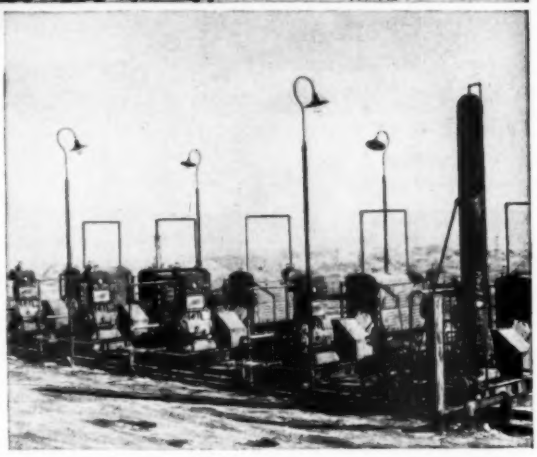
POWER UNITS

SUPPLY DEPENDABLE, LOW COST POWER



The surest way to maintain steady high-level production is through dependable uninterrupted power. Minneapolis-Moline engines for oil field power have built an enviable record for continuous duty without mechanical shutdowns.

Low cost installations of MM heavy-duty engines that provide 25 to 230 h. p. offer exceptional maintenance economy and long engine life. In addition you get these MM exclusive features: *crankcase ventilation, heat exchanger base pans, high-turbulence combustion chambers, regulated cooling, by-pass thermostats, removable cylinder heads and blocks, extra large bearing surfaces, replaceable bearing shells that are steel-backed and precision made, water-cooled manifolds,* and many others.

You, too, will agree that Minneapolis-Moline engines are quality constructed and skillfully engineered for heavy-duty performance in oil field operations.

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All brands stocked by Bovaird are nationally recognized for dependable, trouble-free service under the most severe field conditions.

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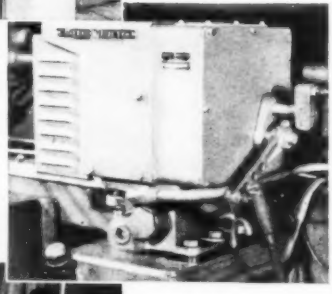
Fuel oil consumption is low on this G-E equipped, diesel-electric offshore rig. This is especially important because all required fuel oil must be brought out from the mainland.

With this floating rig...

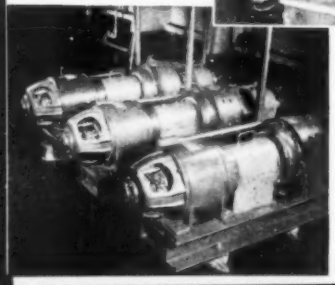
FUEL COSTS DIVE!

Another example of General Electric oil field electrification!

In a G-E drilling-rig drive, controls are centralized at the driller's position. Since they require only a few manual adjustments, the driller has more time for other duties.



The G-E electro-hydraulic governor system acts as an automatic "gear-shift" between d-c motor and engines. It prevents engine overloads, reduces fuel waste, cuts engine maintenance.



These G-E amplidynes, with their high amplification factor, use only a few watts to control main generator fields. When generators work in parallel, they automatically divide the load.

Here—along the Louisiana mainland—is one of the largest diesel-electric rigs ever built for drilling in shallow water. It's operated by a completely co-ordinated General Electric drive that provides flexible operation, lengthens engine life, lowers maintenance costs. And because diesel-electric drilling consumes only about 1 20th the fuel oil required by a steam-engine rig, the problem of over-water fuel transportation is minimized.

Engines protected against overloads!

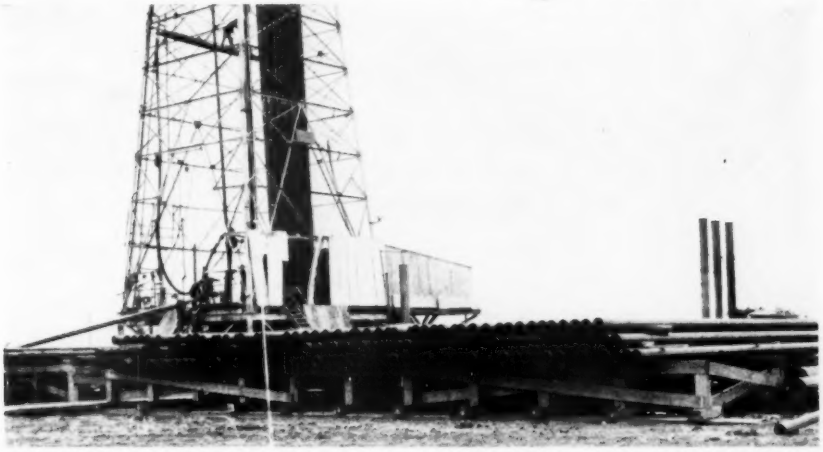
Key to this drive's success is an electro-hydraulic governor which gives automatic diesel-engine speed and load control. This service-proved G-E device 1) protects diesel engines against damaging overloads, 2) saves fuel and unnecessary engine wear by enabling the engines to run at economical low speeds when desired instead of full-rated speed at all times, and 3) provides for engine paralleling without the operator's attention.

Deep well drilling—on land or sea—is only one of many oil-field jobs you can do more efficiently electrically—with the right G-E equipment. There's an oil production specialist in your local G-E office, ready to give you advice and help on all your electrical problems. Why not call him? *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

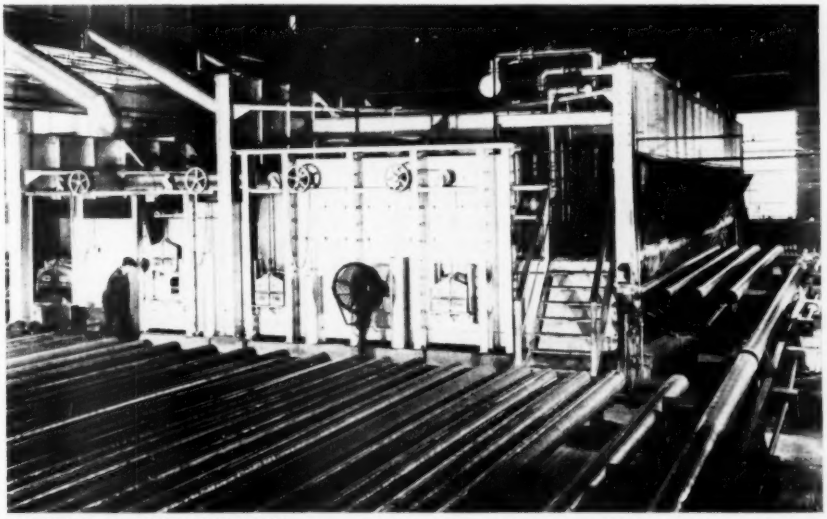
661-2

DEPENDABILITY THROUGH



IN THE FIELD, LOUISIANA: Running a 9200-foot string of 9⅝-inch S-80 A.O. Smith Casing.

RESEARCH AND ENGINEERING



IN THE A. O. SMITH PIPE MILL: A special furnace used for normalizing A.O. Smith Casing.

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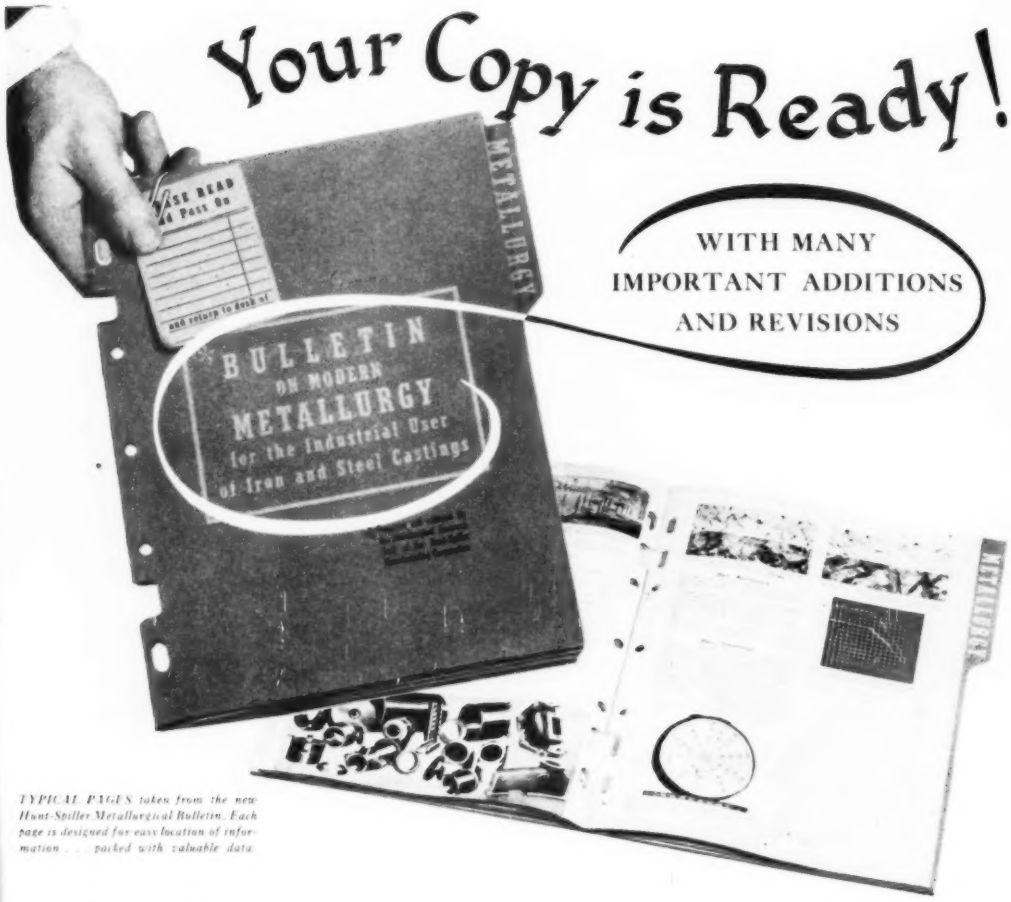
WITH MANY IMPORTANT ADDITIONS AND REVISIONS



TYPICAL PAGES taken from the new Hunt-Spiller Metallurgical Bulletin. Each page is designed for easy location of information . . . packed with valuable data.

Just off the press! This up-to-the-minute and highly informative bulletin is a practical guide for the user of iron and steel castings. Its pages are packed with technical data on many types of metals and alloys or castings. This information has been compiled from the extensive research files of the Hunt-Spiller metallurgical laboratories, among the largest and most modern in the foundry industry. These laboratory files are the result of painstaking investigation of the properties and characteristics of metals by chemical analysis, physical testing, metallography and radiography.

Covered in detail are the properties and characteristics of Gun Iron and many of its alloys. This dense, wear-resistant iron is produced exclusively by Hunt-Spiller by the air furnace process. It has a number of superior physical properties and is widely used for industrial castings subjected to frictional wear, high heat, shock and vibration.

Write for your free copy now. It will prove an invaluable aid to you in the selection of the proper metal for your casting requirements.

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They Say—

Plenty of L.P.G.

"It now appears that there is more than adequate production of butane and propane to supply all of the domestic consumers of Texas and all industry utilizing these hydrocarbons. No consumer should fear a shortage in the near future if he installs reasonably adequate tankage."

William J. Murray, chairman of the Texas Railroad Commission.

Soviet View

"In America the death-dealing crisis has already struck blows not only at light industry but at heavy industry as well.

"This has led to sharp curtailment of production in all branches of American economy, to a drop in foreign trade, a growth in the wave of bankruptcies, and especially to a rapid and steady increase in the army of unemployed.

"In spite of all the tricks of American statistics, they could not conceal the fact that millions of American workers are totally unemployed and therefore without any means of subsistence.

"Tomorrow holds nothing in store but gloom and hopelessness for the capitalistic world."

Radio Moscow, as quoted by the Associated Press.

Preparedness

"If uranium and atomic energy ever take the place of oil in industry, I'll be ready—I have a mine that has what is needed."

R. C. Dulaney, Fort Worth oil man, announcing purchase of 75 per cent interest in Colorado uranium mine.

For State Control

"Unfortunately, and due, as we have been led to believe, to the isolation of Wyoming and its oil fields much of the oil produced has been sold at prices considerably below those prevailing in other sections of the United States. The losses sustained by the land and royalty owners and the producers have been, as has been shown, enormous. Notwithstanding the completion of pipe-line facilities extending into some of the principal refining and marketing centers of the United States, and the completion of the intrastate pipe-line net, glaring price inequalities have persisted and today crude-oil prices in several fields threaten to undermine the entire price structure of petroleum in the state.

"Wyoming has too much at stake to longer continue its policy of laissezfaire. . . . Modern conservation laws based upon the prevention of waste, both physical and economic, in the protection of the public interest and the correlative rights of landowners and operators in a common pool are so fundamental and well established as to need no further comment. Whether Wyoming will continue its lackadaisical policy is a matter for decision of the people. Wyoming's failure to act sooner in the protection of its resources is either a manifestation of gross ignorance or an unwillingness to discharge its responsibilities."

Pierre LaFleiche, Wyoming minerals supervisor, in a paper presented before the Casper Literary Club.

Consumer Is Boss

"Oil exploration, production, or accounting is so remote from the 'ultimate consumer' that geologist, driller, or pumper—or head man in the division office for that matter—can easily lose sight of the fact that the fellow in the flivver who says: 'Give me 5 gallons of regular,' is the man who cracks the whip. Actually he is the fellow who makes the geologist's job permanent and well paid.

"All of us who make things to sell, or who help to sell them, work for this man. Just as does the clerk re-

Bottom Water is a costly profit leak

Eagle Lead Wool

***stops* Bottom Water!**

You rule out the risk of oil-wasting bottom water shutdowns when you tamp Eagle Lead Wool in the hole. This finely stranded, non-corrosive metallic wool makes a water-tight plug that seals every crack and crevice. Comes in convenient 50-pound sacks—easy to place in special cartridge-shaped Eagle Wire Containers sized to fit all casings. Order through your jobber today.

These 3 Eagle Bearing Metals meet most requirements

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EAGLE LEAD WOOL

Seals off Bottom Water—keeps 'em flowing!

THE EAGLE-PICHER COMPANY

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cording geological data in the exploration department. Call him what you like: Customer, purchaser, user, prospect, buyer, ultimate consumer . . . he's the boss. No manufacturer has ever been big enough to disregard the specifications set by his needs and fancy, although some have tried. Most of them died bankrupt. Others saw their error in time and did an about face. Likewise no manufacturer has ever been clever enough to make him eat what he doesn't want to swallow."

The Link, Carter Oil Co.

French Purchases

Sir:

Having read in your issue of December 1 (page 52) the news published under the title "French to Seek Grants," I think it may be useful to give you the particulars hereunder. . . .

Almost all the petroleum coke consumed in France is imported from the United States. Since the war, two private firms centralize the needs of the French industry, and in agreement with the users are entrusted with its buying, import, and allocation. Since April 3, 1949, ECA . . . has always paid for these transactions, which amount to a total annual figure varying between 30,000 and 50,000 metric tons.

As to the import of other petroleum products, a distinction must be drawn between crude oil and finished products. Only finished products are imported by a trade organization controlled very closely by the French Government. . . .

On the contrary, crude oil is bought directly by the refiners who assume also the responsibility of transport. Therefore, this product is the subject of private commercial dealings, where the French administration only intervenes to grant the necessary foreign currency. To state precisely the importance of this private sector, we would indicate that during the fiscal year 1949-50, imports of crude oil will represent 98 per cent in weight and 93 per cent in value of the whole of the petroleum imports of metropolitan France and of French North Africa. . . .

H. Ballande,
General secretary, Syndicate of Petroleum Refiners, Paris.

THE BEST PROTECTION AGAINST CORROSION COSTS LESS IN THE LONG RUN . . . . . .

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CORROSION-RESISTANT PLASTIC

PAINT

HALFWAY protection is worse than none where corrosion is a problem. Ordinary paints provide only a shield behind which corrosion goes on, uninterrupted. Be sure. Play safe. Protect your plant and its equipment with the paint proven over a 10-year period as the paint impervious to attack by most acids and alkalies.

Tygon *corrosion-resistant plastic* Paint is made of chemically inert plastics. It air dries quickly . . . forms a tough, durable, tight-adhering plastic film that *will not* support combustion . . . that *will* resist impact and chipping . . . that *will* provide effective protection against corrosive fumes and gases long past the life of even the best industrial paints.

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RESISTS ACIDS, ALKALIES, WATER, ALCOHOL

NON-OXIDIZING, NON-FLAMMABLE, NON-TOXIC

EASILY APPLIED WITH SPRAY OR BRUSH, DRIES QUICKLY

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Akron 9, Ohio

MANUFACTURERS OF CORROSION RESISTANT MATERIALS & EQUIPMENT SINCE 1865

Lower Profits

"Oil stocks . . . haven't been the market leaders they were in 1948. Their performance has been well below average—particularly since the rally started last June. . . .

"The reason for the poor show in oils is easy to spot. Wall Street looks for profits in the industry to run as much as 35 per cent below 1948. . . .

"While profits have dropped, they remain large by prewar standards, haven't yet slipped to a point where dividends are in danger. . . ."

Business Week.

Soundless-Sound Application

"Inquiry at Sohio's Research Laboratory brings the ready admission that there are possible applications of ultrasonics in oil refining. Now that elements of sufficient size are apparently to become available, Sohio researchers are interested in the possibilities, but point out that there's another obstacle still remaining—the tremendous expense of the electric power that would be required. Sufficient electric current to set up the soundless vibrations would cost seven or eight times as much as the heat energy now used in refineries. But our scientists don't rule out the possibility that the cost may come down as ultrasonics come into more general use."

The Sohioan, Standard Oil Co. of Ohio.

Unitization Savings

"It is estimated that on the two fields unitized (in Mississippi) the revenue that might be expected over the life of the field will be increased approximately 30 per cent due to the processing of gas for liquid hydrocarbons and the maintaining of reservoir pressure through gas injection."

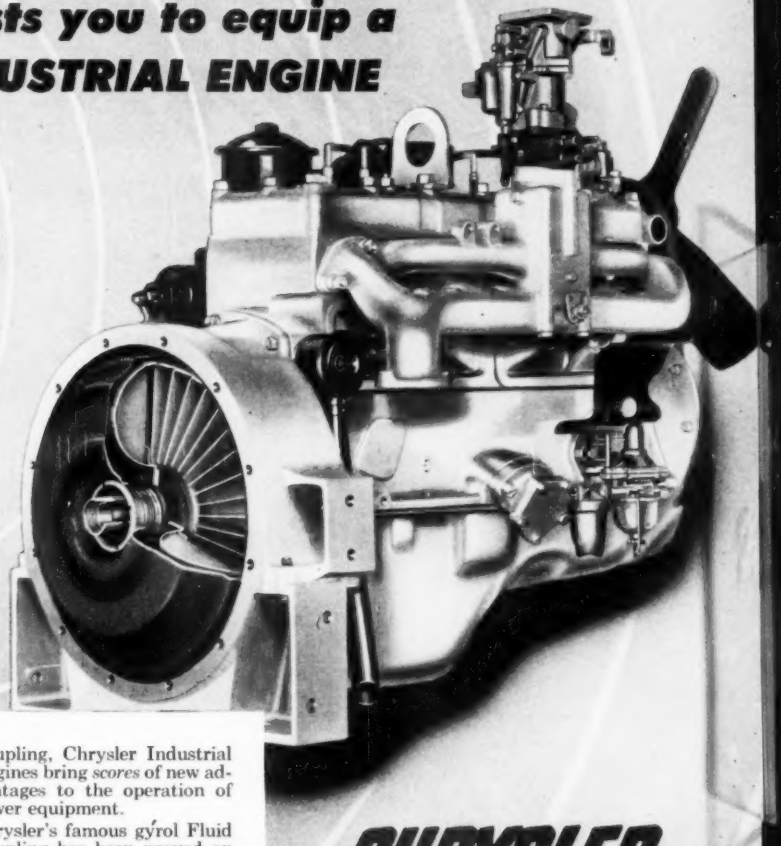
Report of H. M. Morse, secretary of the Mississippi State Oil and Gas Board.

IT'S AMAZING

how little it costs you to equip a CHRYSLER INDUSTRIAL ENGINE *with . . .*

gýrol

Fluid Drive!



Does operation of your equipment require frequent clutching and de-clutching?

Is your equipment subjected to damaging shock loads? Is it desirable to speed up your engine close to torque peak with the output shaft turning at a lower speed?

Do shock loads sometimes stall your engine or cause failure of drive train parts? Would gradual oil-smooth acceleration improve your operation?

If your answer is "yes" to any of these questions, better investigate Chrysler Industrial Engines now! With gýrol Fluid Coupling, Chrysler Industrial Engines bring *scores* of new advantages to the operation of power equipment.

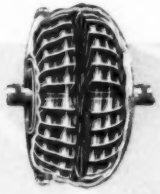
Chrysler's famous gýrol Fluid Coupling has been proved on more than a *million* Chrysler, DeSoto, and Dodge passenger cars and trucks over a period of 11 years. *Proved* on scores of industrial applications.

Its cost is amazingly low! *Actually only a few dollars more than the cost of the conventional flywheel which it replaces!* For more information, see your nearest Chrysler Industrial Engine Dealer, write us, or *mail the coupon today!*

CHRYSLER

Industrial Engines and Power Units

HORSEPOWER WITH A PEDIGREE



As the driver turns inside the sealed steel drum, the confined oil produces a powerful swirling out-thrust. Instantly the Runner receives the impulsion and transmits smooth power to the load.

1-2

INDUSTRIAL ENGINE DIVISION, CHRYSLER CORPORATION
12200 E. Jefferson, Detroit 31, Michigan

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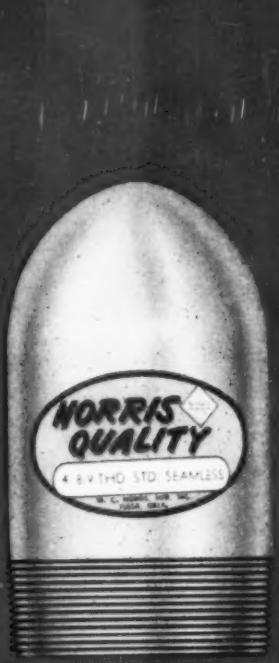

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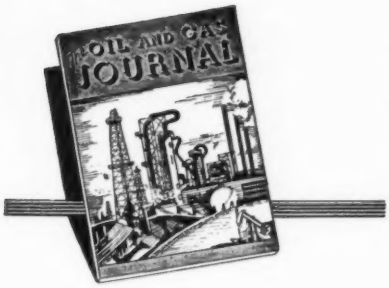

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JOURNALLY Speaking

Top o' the World

WHAT'S the biggest magazine in the world? Saturday Evening Post? Nope. Life? Guess again.

It's what you're reading right now—the good old yellow-covered Oil and Gas Journal.

Surprised? Well, here's proof. We'd probably be too modest to mention it ourselves, but the beans have already been spilled by Advertising Age magazine. For a good many years it has been compiling records of periodicals of all sorts, and it says we are now the biggest in the world.

Its yardstick is the number of pages of advertising carried during the year. During 1949 the Journal carried 6,564 pages of advertising, and there isn't a periodical of any kind—p o p u l a r, women's, business, scientific, or what have you—anywhere in the world that came close to it.

Of course we're not the largest in circulation (you readers belong to an exclusive set), nor in advertising revenue (alas), nor in acreage of white paper chewed up. And by most any yardstick the big metropolitan daily newspapers outrank all magazines.

How about the popular weeklies? Well, in contrast with our 6,564 pages of advertising, Saturday Evening Post carried 4,123 pages last year, Life carried 3,548, and Collier's 1,666. The No. 2 spot went to another business publication, Iron Age.

Our boys in the advertising department are willing to take a bit of the credit for this accomplishment, but they recognize that the real truth is that the petroleum industry is responsible. It is now one of the world's biggest markets for industrial goods and services, and people who have things to sell to this market realize that the Journal's 48-year growth has paralleled the growth of the industry.

Another reason is just what you're doing now—reading the Journal. Without readers—not just circulation, but r e a d e r s—we'd have mighty little advertising. Incidentally, our circulation is at an all-time high, also.

Apparently nobody adds up the number of pages of editorial material printed by the various magazines in a single year, but we think we would be just about tops by that yardstick, too. Last year we carried 4,086 pages of editorial material, making a total of 10,650 pages. All good, too.

Scotch vs. Petrol

THE average Englishman has to work four times as long to buy a gallon of gasoline as an average American, the National Industry Conference Board reports in a study of Britain's economic situation since devaluation of the pound.

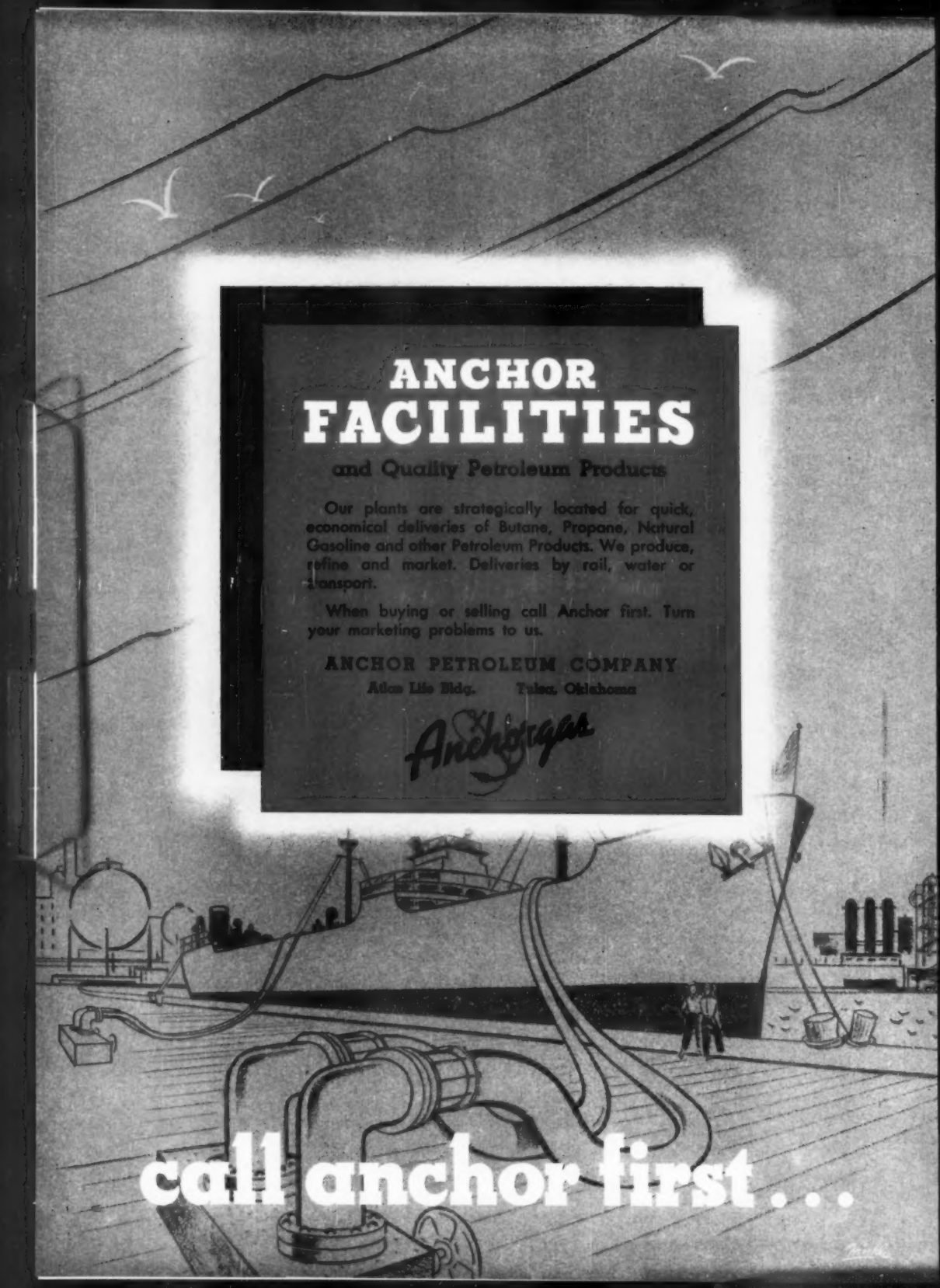
By itself, this statement might lead to some tear-jerking comparisons of the relative abundance of resources in the two countries. But the study goes on to show that over there where they make the stuff a Briton has to work six times as long as a New Yorker in order to buy a drink of Scotch whiskey, which suggests that governmental controls might have more to do with England's plight than dearth of indigenous crude reserves.

Up the Ladder

SOCONY-VACUUM OIL CO., INC., would have a best seller on its hands except that it prefers to give away its pocket-size book "So You Want a Better Job." It is a summary of the things company executives consider in hiring, firing, and promoting employes, and since word of it got around the company has filled 150,000 requests for copies outside of its own ranks.

It's a helpful little book, but a bit disappointing in one respect. It all boils down to this: "Do everything you have to do better than you have to do it." We had hoped that by this time somebody would have figured out an easier way.

Henry D. Ralph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Crude Oil, Natural Gasoline and Liquefied Petroleum Products

Effective Cooperation

DETROIT.—The annual meeting of the Society of Automotive Engineers held here last week is a forum of direct interest to the oil industry. Of the 15,000 plus members from all over the world, more than 1,000 come from the refining, distribution, and allied phases of the oil business.

As the principal organization representing enterprises which manufacture the most important oil-consuming products, and which are themselves large buyers of the output of refineries and of natural gas, all divisions of petroleum have a direct concern in what takes place at these annual sessions. One is impressed with the research and development and the resulting perfections in mechanical design that have made possible today's automobiles, tractors, airplanes, and other automotive equipment, and which in turn have steadily widened the markets for petroleum products.

Representatives of the oil industry participate directly in the program of the fuels and lubricants division and account for approximately 50 per cent of the membership. As reflected in the program here, petroleum technologists are equipped to carry on research work covering actual performance of fuels and lubricants under all operating conditions. The automotive companies are equally prepared to duplicate all these investigations, including chemical studies of the operating characteristics of products. Some of this work is facilitated by joint activities of the two industries. Thus, each industry has the information which is the basis for effective cooperation in all matters applying to fuels and lubricants.

As to the future, James C. Zeder, executive head of Chrysler engineering and the S.A.E. president, replying to an interview question as to the future trends in compression ratios in engines and octane ratings in motor fuels, said it was a "matter of economics." This appears to be an excellent rule to apply in all the interrelationships between the two industries.

It would be folly for the automotive companies to design engines that could not be economically fueled. By the same token the oil business has the duty to improve fuels and lubricants to the end that the applications of automotive power can be strengthened and widened.

There is a feeling here among students of both industries that possible checks in the further growth of automotive power do not stem from the motor vehicles or their fuels. It is contended that much needs to be done in modernizing of highways and streets so that owners of motor vehicles can obtain the maximum use of what will shortly be 45 million units.

While this is a general problem of all the public, the manufacturers of cars and fuels know more about it than anybody else and have more at stake in its solution. State highway departments and city administrations, plagued with traffic controls and inadequate parking, will welcome practical suggestions. All has to be accomplished without the imposition of burdensome taxes on the car owner. This suggests that the cooperation between the oil and automotive industries which has been so effective in technical matters might be expanded in the interests of everyone concerned.

THIS WEEK

IMPORTS—Fight against imports of oil heading for a climax. . . . Bill introduced to tax crude and major products $1.05 per barrel. . . . Independent producers mobilizing forces in support. . . . Meetings in Washington next week may bring demands for quick action. . . . Former quota scheme losing favor to straight import tax. . . . Texas blames imports for continued curtailments in production, impairing state's economy. . . .

NATIONAL AFFAIRS—President asks legislation for continued government production of synthetic rubber. . . . Continued mandatory use of some synthetics. . . . Gradual sale of some butadiene and copolymer plants to industry. . . . ¶Backstage maneuvering now in progress to get compromise on bill defining Federal Power Commission's jurisdiction over independent producers of natural gas. . . .

TRENDS—Bureau of Mines estimates that first-quarter demand could be met by refinery runs of 5,500,000 bbl. daily. . . . Runs of foreign crude have averaged 534,000 bbl. daily for 4 weeks. . . . At this rate runs of domestic crude would be 4,966,000 bbl. daily. . . . Crude exports are expected to be about 80,000 bbl. daily. . . . With no crude stock change, required production of crude and field condensate would be 5,046,000 bbl. daily or about 4,985,000 bbl. daily for crude only. . . .

ACTIVITY—Crude production averaged 4,849,550 bbl. daily for the week ended January 14, a decrease of 22,950 bbl. daily from the previous week. . . . ¶Total completions increased 100 wells to 817. . . . Wildcat completions were up 31 wells to 142. . . . ¶Rotary rigs operating in the United States decreased 43 rigs to 1,991 on January 9. . . .

COURTS—Justice Department files big antitrust suit against Sun Oil Co. charging exclusive-dealing contracts with service stations. . . . Part of long-threatened campaign following similar case against Standard Oil Co. of California. . . . Sun denies all charges. . . . ¶Supreme Court will review antitrust case against Cotton Valley unitization operation which was thrown out of lower court. . . . ¶Arguments on tidelands case postponed by Supreme Court. . . .

INTERNATIONAL—Dollar oil virtually excluded from another European country as British make trade agreement with Yugoslavia. . . ¶New Colombian decree law makes gesture to foreign capital but raises fees. . . . Operators disappointed. . . . ¶Successful Mexican wildcat in southern Veracruz being completed in two sands. . . . ¶Proposed Italian mining law limits oil development to state monopoly. . . .

REFINING—Octane race is on again. . . . Both premium and housebrand gasolines moving upward in octane ratings in many regions. . . . Many believe high octane unjustified. . . . May lead to "third grade" fuel. . . . ¶Ways to cut maintenance costs seen by management engineers as important problem facing refiners. . . . ¶Independent Refiners Association of America perfects organization, elects officers. . . .

SYNTHETICS SOON.—First photo released of the huge petrochemicals project nearing completion near Brownsville, Tex. Right center is installation of Carthage Hydrocol, Inc., where 90,000,000 cu. ft. of natural gas daily will be converted into approximately 6,000 bbl. of gasoline, 900 bbl. of gas oil, and 200 bbl. of fuel oil. Byproducts will go to plant of Stanolind Oil & Gas Co., upper center, for separation into a dozen alcohols and industrial chemicals which will receive final processing and packaging in plant of U. S. Industrial Chemicals, Inc., at extreme left. Brownsville ship channel in foreground provides deep-water transport and cooling water for the Hydrocol plant.

Imports Showdown

Fight to limit oil flow into United States moving toward early climax; voluntary cuts, tariff, quotas proposed

Henry D. Ralph

THE controversy over petroleum imports appears headed for an early showdown.

In Washington this week several oil-state congressmen took action looking toward government curbs on the flow of foreign oil.

In the Southwest oil producers began mobilizing forces to fight for any form of action which promises to restrict competition from abroad.

Imports will be a hotly debated subject at the meeting of the National Petroleum Council in Washington next week. There will be demands that importing companies voluntarily curtail their announced plans to bring in even larger quantities of foreign crude than they have been importing in recent months.

Failing in this, the council will be asked to do something to implement its policy statement that imports should supplement but not supplant domestic production. If nothing positive comes out of this meeting most domestic producers will, with some reluctance, turn to federal action as the only recourse.

Legislation talked.—The proposal most commonly discussed is a tariff of $1 per barrel on crude, with proportionate duties on refined products. Existing law now provides an excise tax of 42 cents per barrel on crude imported, but this was twice halved by executive action in reciprocal trade agreements and the present 10½ cents is little impediment.

Domestic producers say that restoration of the 42-cent rate by executive action would not offset the difference between foreign and domestic production costs sufficiently to reduce imports substantially. However, there are indications that the $1 figure is something of a talking point and that they might settle for anything over 50 cents per barrel if it appeared that such a compromise could win approval of the Washington administration.

Last year Congress came within an eyelash of voting an amendment to reciprocal tariff legislation which would have put oil imports under a quota of 5 per cent of domestic production. This proposal may come up again, but domestic producers now generally favor a flat impost. The difficulties of assigning and policing quotas would be a large administrative headache.

One novel proposal under discussion is a certificate plan, designed to bolster our declining exports, at the same time limiting imports. Every barrel of crude or petroleum product exported would get a certificate good for duty-free import of one barrel of foreign oil. These certificates would be negotiable, and an exporter could sell them to an importer. Imports not accompanied by certificates would pay the full duty of $1 per barrel, or whatever figure is fixed.

The Washington administration is committed against high tariffs, import quotas, and other restrictions on world trade. But independent producers have hopes of "softening" this attitude, or of mustering enough congressional strength to override it.

Action in Washington. — Last week Rep. Albert Thomas of Texas took to the White House the complaint of independent producers that they are in grave danger of serious injury from the flood of imported oil. He reported that President Truman expressed concern over the possibility that exploration and wildcatting may be curtailed, and promised to have a study made.

Over the week end Rep. Wright Patman of Texas, chairman of the House committee on small business, released a summary of the committee's study of oil imports and announced that he would attempt to enlist White House support for restrictive legislation.

The summary was a compilation of statements to the committee by principal importing companies showing their imports for 1949 and projected imports for the first half of 1950. This revealed that imports of crude will average 510,300 bbl. daily, or 45 per cent more than in 1949, and imports of products will average 280,400 bbl. daily, an increase of 75 per cent. More than 90 per cent of the projected imports will be brought in by 11 major companies.

Patman expressed amazement over the great increase in imports indicated by the companies, whose spokesmen, he recalled, had testified that imports were not affecting domestic production and no restrictions were necessary.

"It is impossible to believe that we can import 790,700 bbl. of crude oil and products every day during the first 6 months of 1950 without endangering the domestic industry when production of crude oil in the United States is cut back approximately 700,000 bbl. per day," Patman said.

"If the increases estimated by the principal importing companies are to be accepted as an indication of what is to be expected from their definition of 'free enterprise,' then the independent producer can no longer depend on corporate conscience, and legislative or executive aid is necessary for his protection."

Early this week Rep. Ed Gossett of Texas introduced a bill to raise the excise tax on imported crude oil, residual, and distillates to 2½ cents per gallon, or $1.05 per barrel. It would also restore the tax on gasoline to 2½ cents per gallon, rescinding the cut of 1¼ cents made in 1948 by the Geneva trade agreement.

Gossett said it would develop a revenue of more than $300,000,000 a year and would have the effect of stabilizing the domestic industry. He proposes to offer it as an amendment to any tax legislation which comes up in the House.

I. P. A. A. mobilizes.—In Tulsa on a visit to the headquarters office of the Independent Petroleum Association of America, J. Ed Warren of Midland, Tex., president of the association, said that all forces will be consolidated for a fight to restrict imports. The association is conducting a membership drive, has been holding regional group meetings to discuss the situation, and plans to work with other associations and state officials in pressing for action.

"The recent British ban on American oil makes the situation in this country more critical," Warren said. "It increases the pressure to ship crude to the United States, and the world excess of refining capacity means that more refined products may be headed this way. Texas producers alone have been forced to curtail production 500,000 bbl. per day below efficient capacity, state governments are suffering severe losses in revenue, and reports from many oil areas indicate that drilling is declining."

Warren said his association has not yet settled on any particular remedy, but was prepared to support any legislative proposal which has a reasonable chance of being adopted by Congress.

A more specific program may be adopted by the I.P.A.A. shortly, however. The association's executive committee and its import policy committee will meet in Washington January 22 and 23, just prior to the meeting of the National Petroleum Council January 26.

Texas reaction.—In Austin, William J. Murray, Jr., chairman of the Texas Railroad Commission, appointed a

"citizens committee" to study the impact of oil imports on the economy of Texas and the state's revenues, and "to acquaint the citizens of Texas with the threat of physical waste of their natural resources and the threat to their schools and universities, their private business and jobs."

Gasoline-Octane Race

General increase noted in Midwest; further improvement expected before arrival of heavy-demand summer period

CHICAGO.—The octane race is on again. This is agreed by competent observers who have been watching recent developments in motor fuels.

Over the past 60 days there have been general increases in the octane ratings of motor fuels throughout the Middle West, and it is felt that additional increases will materialize before the summer demands are under way.

Indicative of the trend is the recent action of a large common-carrier products pipe-line system serving part of the Middle West and connecting to several refineries in Kansas and Oklahoma. It has increased by two points the minimum specifications for gasoline which may be tendered for transportation. Effective February 1 premium gasoline must have an octane rating of 88 (research method of test), and after March 1 regular grade must have a rating of 82 (research).

Last September 20 Ethyl Corp. shifted its minimum requirements for premium grade known as Ethyl gasoline from 78 motor method to 86 research method except in high-altitude areas of the Rocky Mountain states, where the minimum specification is 83. This change in method of measurement did not necessarily raise the antiknock characteristics of the motor fuel, however.

The company no longer has a minimum requirement for regular grade, and the premium requirement applies only to that gasoline sold under its trade name of Ethyl. A recent survey by the company showed an average octane rating of 89 for all premium gasolines.

Regular grade housebrand gasolines are being sold in this area with octane ratings in excess of 82 and higher than 88 for the premium. The race, however, appears to center in other parts of the country. In the eastern states premium grades as high as 92 are being sold by several companies, with regular grades up to 85 or even higher in isolated instances. In Texas it is reported that some of the premium grades have a 93-94 octane rating, with less emphasis placed on high-octane ratings for regular grades.

At the same time there has been little change in the octane ratings in other parts of the Southwest. The same situation applies to parts of the Rocky Mountain states where high altitudes minimize the need for high-octane ratings.

Improvement explanation.—Three reasons are offered in explanation for the renewed emphasis placed on octane ratings. First, there is the fact that gasoline is in adequate supply everywhere, with some indications that there may be excessive material later in the year. This development always results in keen competition with emphasis on quality. Second, the completion of new cracking installations and the modernization of existing facilities have increased the quantities of the higher-quality material available. Finally, the introduction of 1950 cars and trucks has been accompanied with the announcement in some cases that the compression ratios of engines have been raised.

As to quality, many sellers are emphasizing the increase in octane ratings, and this tends to establish new standards throughout a given market. The big expansion in catalytic cracking and the greater emphasis on alkylation, polymerization, and other reforming operations have made it possible for several refiners to increase the octane ratings of their base stocks and with the use of tetraethyl lead obtain the higher end-products without prohibitive costs.

These new facilities explain the exceptionally high octane now available in the East and parts of the Southwest and indicate what will happen eventually in other areas.

As to the needs of the new cars, it is contended by some that not one requires ratings in excess of 90 octane and with minor adjustments it is claimed they will operate satisfactorily with 86 to 88 octane fuel. However, the sellers of the 90-plus grades emphasize that their fuels assure maximum performance with engine adjustments in those engines where compression ratios have been raised.

In this connection it is agreed that most of the cars which are 2 to 10 years old do not require the higher-octane fuels. With this situation in mind there are some refiners who are not participating in the octane race and do not expect to this year.

Asked how far the race can go, one well-known technologist said that in a well-balanced operation, with emphasis on maximum catalytic cracking facilities, it would be possible for the owner to manufacture 85-octane regular and 95-octane premium with reasonable quantities of tetraethyl lead. This technologist agreed that costs would be greater over the lower-octane fuels but not to the point where they would be excessive.

Third-grade gasoline.—It should be mentioned that some sellers this winter are stressing the greater volatility of their fuels. It is pointed out that there have been substantial increases in the production of butane both at refineries and natural-gasoline plants, and during the winter months this enables refiners and jobbers to step up their volatility and still stay within the vapor-pressure limits for winter motor fuels.

The added butane and other light hydrocarbons, however, do not step up the octane ratings—in fact tend to increase the problem of arriving at the highest ratings. There is the further fact that in this territory increasing quantities of cycling-plant gasoline, which usually contains a large percentage of butane, are being made available. It is impossible or costly to blend these gasolines to the highest octane ratings available from other sources.

This situation is leading to discussions as to whether or not the distributing end of the oil business is not again headed for a "third grade" gasoline, a common practice in many sections of the country during the early and middle thirties. It is pointed out that these volatile fuels would satisfy the octane requirements of most cars, with a saving in both manufacturing and blending costs.

Oil's Finances

Company earnings shrink but dividend rates climb

DESPITE a drop of 28 per cent in income in 1949, 30 leading United States oil companies were able to increase dividends by 18.5 per cent over 1948 because of lower capital expenditures.

Earnings of these 30 companies in 1950 are expected to be less than in 1949, but cash requirements for capital expenditures will likewise be lower, thus enabling them to maintain present dividend rates fairly well.

The source and use of financing undertaken in the petroleum industry last year has been analyzed by Joseph E. Pogue and Frederick G. Coqueron, of the Chase National Bank, New York, in a study made public by the bank last week.

Financing transactions in 1949 were divided into those by the group of 30 oil companies and those by other oil companies. Combined financing transactions of both groups amounted

to $868,000,000 compared to $1,167,000,000 in 1948, a reduction of $299,000,000. Of the outside capital secured, 97.1 per cent was borrowed and 2.9 per cent came from common stock.

The money borrowed during the year, amounting to $843,000,000, was obtained 56 per cent from insurance companies; 24.5 per cent from public investors and others; and 19.5 per cent from banks. Of the full total of $868,000,000 financed in 1949, $121,000,000 was for debt refunding or retirement, $210,000,000 for acquisition of assets, and $537,000,000 for capital expenditures and working capital.

A summary accompanying the analysis said: "Despite a drop in income of $526,000,000 or 28 per cent in 1949, the 30 oil companies, which comprise two-thirds of the industry, were able to increase dividends by $87,000,000 or 18.5 per cent over 1948 because capital expenditures were lower by some $279,000,000 or 10.8 per cent.

"Dividends in per cent of net income for the 30 oil companies rose to 41.3 per cent in 1949 from an extremely low ratio of 25.1 per cent in 1948 when capital requirements were at a maximum. The petroleum industry, like many other industries, was able to pay its stockholders a larger percentage of net income in 1949 and still maintain a high rate of capital formation."

Saving on Maintenance

Rising costs of repairs, upkeep cited before management representatives; means of effecting savings outlined

George Weber

CLEVELAND. — Maintenance is a growing problem, but it is one which offers substantial savings if tackled correctly.

This was the view of management representatives attending a 4-day conference on plant maintenance here January 16-19.

Efficient organization of maintenance and accurate measurement of maintenance work as it is done were stressed by two speakers as whys of making large reductions in costs.

What it costs.—The importance of a serious approach to the maintenance problem was pointed out by J. E. Sutherland, vice president of MacDonald Bros., Inc., who said that American industry spent more than 8.6 billion dollars on maintenance and repairs during 1948—more than industry's total net profits after taxes in 1929.

Maintenance bills for 1946 and 1947 were 5.4 and 7.2 billion dollars respectively, Sutherland said. Figures were from a survey made by his company, a management-engineering firm, of 935 companies in 70 industries.

The petroleum industry, they showed, fared better than comparable industries in recognizing and controlling maintenance costs. The median for 11 selected oil and gas companies engaged in development and production showed maintenance percentages of 4.97 per cent of net sales, 2.44 per cent of gross property, and 4.27 per cent of net property.

A selection of 34 petroleum-refining companies showed a maintenance median of 3.77 per cent of net sales, 3.42 of gross property, and 6.96 of net property. Figures were for 1948 operations.

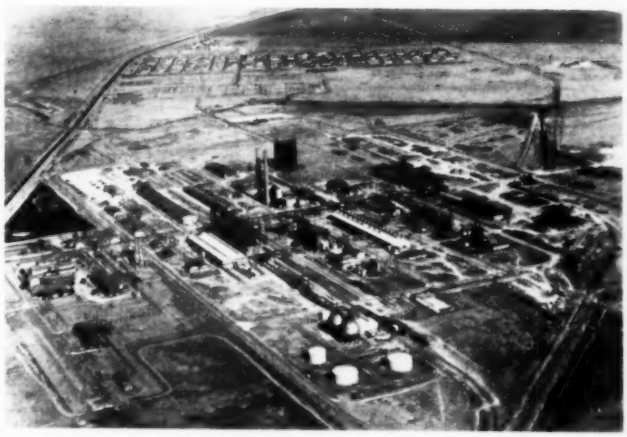
Petroleum and natural-gas companies showed lower maintenance percentages of net sales than chemical, coal mining, and metal mining industries, but higher than the automotive and all-industry classifications. The refining industry was lower in this category than any of the listed industry classes.

When maintenance costs were expressed as per cent of net property, oil and gas producing ranked lowest of the 58 manufacturing and producing groups, and the refining industry was fourth from the bottom in the list of 58.

Cutting labor costs.—How direct labor costs in maintenance can be reduced as much as 30 per cent was outlined by C. C. Winston, of Wallace Clark & Co. Proper organization of maintenance programs, he said, is the secret. Winston stressed the anticipation and prevention of interruptions rather than repairs after a breakdown.

He cited 11 rules as fundamental principles for successful plant maintenance: (1) Know what requires maintenance. (2) Know the condition of that equipment. (3) Schedule lubrications. (4) Have a job-order system for requesting and authorizing work. (5) Plan the work of each craft —each day. (6) Size the maintenance force to the job at hand. (7) Know costs by job order. (8) Know costs by item of equipment. (9) Size maintenance stores on estimated usage. (10) Pay maintenance personnel adequate salaries and wages. (11) Insure top-level interest by adequate executive reports.

Work measurement.—The importance of measuring maintenance work as it is done was stressed by Albert Ramond, head of the industrial-engineering firm of Albert Ramond & As-



FROM GAS TO GRASS.—Finished fertilizer ready to apply to crop and pasture lands is now being made at this enlarged plant of Phillips Chemical Co. at Etter, Tex., 60 miles from Amarillo. In the center is the former Cactus Ordnance Plant, leased from the Government by Phillips in 1948 and enlarged to produce 150,000 tons per year of anhydrous ammonia from natural gas and air. To the lower right, and tied in with the ammonia plant, is Phillips' newly completed plant to make 300 tons per day of fertilizer from ammonia, part marketed as solid prilled ammonium nitrate and part as nitrogen solutions. Nitric acid for this operation is produced by oxidation of ammonia in a plant completed by Phillips this month, located a safe quarter mile to the right, outside this picture. Part of the anhydrous ammonia produced in the Cactus plant is shipped to Phillips' fertilizer plant at Port Adams, Tex., which is now producing ammonium sulfate at the rate of 258,000 tons per year.

sociates, Inc. A record of costs over a period of years will furnish a yardstick of what maintenance is and should be, he said.

He cited examples showing how the combination of direct measurement and incentive payment had brought substantial savings. Costs for carrying out both measurement and incentive programs he has observed, he said, run from 3 to 6 per cent of the maintenance payrolls — higher than those for straight production operations but small when compared with results.

The conference, cosponsored by the American Society of Mechanical Engineers and the Society for the Advancement of Management, was held in conjunction with the Plant Maintenance Show.

It was the first conference and exposition devoted exclusively to the subject of efficient plant maintenance and indicated an increasing concern on the part of management in the conditioning of producing equipment.

Wyoming Price Cut

TULSA.—Stanolind Oil Purchasing Co. last week announced it is meeting the price cut of Ohio Oil Co. for heavy Wyoming crude oil.

Stanolind announced a flat price of $1.50 per barrel for Byron and Garland fields. A flat price of $1.40 was fixed for crude from Torchlight (heavy), Oregon Basin, Kirby Creek, Hamilton Dome, Little Buffalo, Gooseberry, Circle Ridge, Black Mountain, and Maverick Springs fields. These formerly were purchased under a gravity schedule which ranged down to 15°.

Ohio's price change was effective last December 20. It affected Byron, Garland, and Oregon Basin fields.

Texas Co. Leaves Michigan

For the second time in 15 years The Texas Co. is moving out of Michigan. Land and geological office there will be closed about February 1.

During this second period of activity, of about 5 years' duration, the company has been issued one drilling permit and had been interested in several wildcats, none of which were successful. Texas now has 50,000 acres under lease in Michigan, including several wildcat blocks in the northern part of the state.

I.R.A.A. Elects Officers

TULSA.—Harry Leyendecker, Houston, vice president of Eastern States Petroleum Co., last week was named president of the Independent Refiners Association of America.

The association was first formed in Chicago on November 7, and Leyendecker was appointed by 70 independent refiners to serve as chairman of the executive committee.

Other officers elected here last week include: James P. Dunnigan, president of Producers Refining Co., West Branch, Mich., M. Loyd Freese, vice president, Bell Oil & Gas Co., Inc., Tulsa, and M. H. Robineau, president, Frontier Refining Co., Denver, vice presidents; D. W. Hovey, president, Danaho Refining Co., Houston, secretary-treasurer; and two additional directors, Fred C. Koch, president, Wood River Oil & Refining Co., Inc., Sheboygan, Wis., and Robert O. Anderson, president, Malco Refineries, Inc., Roswell, N. M.

In permanently organizing the association, the executive committee appointed committees to study proposals for proration of wet gas used by recycling plants and to study the question of imposing tariffs on imported petroleum products.

NATIONAL AFFAIRS

Suit Against Sun

Exclusive-dealer contracts are alleged in action citing Clayton, Sherman Act violations; Sun denies all charges

Betram F. Linz

WASHINGTON. — The Department of Justice last week switched its campaign against exclusive dealer contracts to the East Coast, filing a civil suit in Philadelphia charging Sun Oil Co. with violations of the Sherman and Clayton antitrust acts.

The complaint, filed in the federal District Court, charged that Sun has compelled approximately 10,000 independent service station operators to enter into and operate under agreements which require them to purchase petroleum products and various automotive accessories exclusively from Sun.

Sun's operating area covers the District of Columbia and 18 states from Maine to Florida in which the company itself is alleged to own and operate fewer than 50 service stations.

Allegations.—The department alleged that:

The contracts prohibited operators from installing storage or dispensing equipment and selling any petroleum products other than those sold by Sun.

They required the purchase and sale of only Sun's motor oils and greases as a condition to the right to purchase and sell its gasoline.

They provided that in the event an operator failed or refused to purchase either his entire requirements or certain minimum quantities established by Sun, the company could make a penal charge of 1 cent on each gallon of petroleum products expected to be sold in the station during the remaining period of the contract plus a sum equal to 1 cent per gallon on all gasoline, motor oil and greases sold in the station in the past.

They gave Sun the right to cancel the contract at any time on 24 hours' notice if the operator installed the equipment of other companies or sold their gasoline or other products, or failed to purchase the minimum quantities of products required by Sun.

That Sun employed a variety of coercive practices to compel dealers to enter into and abide by the exclusive dealing arrangements, such as increasing service station rentals, exercising the penal provisions of the contract, canceling operators' leases and supply contracts on short notice, refusing to continue or renew short term leases and contracts, discontinuing delivery of gasoline and retaining money deposited with the company by operators.

Sun statement.—In Philadelphia Sun President Robert G. Dunlop issued a statement expressing amazement at "the conglomeration of false charges, innuendoes, and misleading statements" in the suit.

"It is upon such erroneous and extravagant contentions that (Attorney General J. Howard) McGrath bases his charges that Sun Oil Co. has so conducted its relations with service-station dealers . . . that it has 'foreclosed to competition' the 18-state market where it has retail outlets," Dunlop said. "This statement is ridiculous to anyone with only a superficial knowledge of the oil business."

In a strong denial of the charges, Dunlop said the company "will welcome an early trial so that we can have an opportunity to present the truth and refute these unjust accusations."

Action sought.—The Justice Department asked the court to cancel existing contracts and agreements which obligate operators of service stations to purchase their products and accessories exclusively from Sun, and to prohibit the company from entering into such arrangements in the future.

The court was also asked to order Sun to make provisions in future leases for: (1) a term of not less than 5 years, (2) a guaranty of the lessee's right freely to transfer or assign the lease, (3) a limitation of Sun's right to cancel leases to situations in which there has been a breach of reasonable

covenants, such as illegal use or waste of the premises or nonpayment of rent, and (4) a requirement that Sun give 90 days written notice of cancelation.

The department further requested the court to retain jurisdiction of the cause of action after the entry of a final decree in order to determine whether it has effectively eliminated Sun's exclusive-dealing arrangements and dissipated the effects which those arrangements are alleged to have had upon competition. If it should appear after a reasonable trial period that competition between Sun and other suppliers has not been sufficiently restored, the department asked that Sun then be required to dispose of its interests in service-station properties.

Government view. — Announcing the filing of the suit, Assistant Attorney General Herbert A. Bergson, head of the antitrust division, said that the value of products and accessories distributed and sold by Sun through its dealer outlets exceeded $400,000,000 in 1948, proving that "the market alleged to be foreclosed to competition is substantial."

"It is hoped that this market may be opened to all and the complete independence of service station operators restored by a reformation of Sun's leases and a court order enjoining Sun from entering into exclusive dealing arrangements in the future," Bergson said. "If these efforts to restore competition fail, the Government will have no alternative but to request the court to order the defendant Sun to dispose of its interests in service station properties so that the operators of these retail outlets may be freed of all danger of control."

Attorney General McGrath also had comment on the first big oil case to be brought since he took over administration of the Justice Department.

"Vigorous new enterprise," McGrath said, "cannot develop unless businessmen, large and small, are guaranteed free access to markets. The purpose of this suit is to make it possible for the numerous suppliers of different brands of petroleum products and automotive accessories to compete for the substantial market represented by these 10,000 service station outlets. This antitrust action will also permit each service station operator to purphase the petroleum products and accessories that he believes will bring the best quality at the lowest price to his customers."

Cotton Valley Review

WASHINGTON.—The Supreme Court last week agreed to review the action of the federal District Court at Shreveport which threw out the Government's so-called "Cotton Valley" suit because of the refusal of the

WATCHING WASHINGTON

Bertram F. Linz

Off-Stage Preparation

A lot of quiet dickering is going on between the Capitol and the White House looking to administration acceptance of legislation exempting independent producers and gatherers of natural gas from Federal Power Commission control.

The legislation, passed by the House, got jammed up in the Senate last year when former Power Commissioner Leland S. Olds suddenly reversed his position and launched a fight against it.

Just what is involved in the talks which have been held so far is not known, but it is quite probable that if the President accepts the exemption bill he will pick up some votes for some phases of the legislative program he has laid before Congress.

It is expected the negotiations will be speeded up as a result of a Supreme Court decision this month which strengthened the authority of the FFC over the distribution of natural gas. Since the court supported the commission at that end of the pipe line, it is considered probable it also would affirm any authority the commission might assert over production and gathering if the issue came to it in the future, making specific legislation in that field desirable.

Good-Faith Decision

The Supreme Court's opinion in the Standard Oil Co. (Ind.) case involving the "good faith" defense in discrimination in gasoline prices in the Detroit area is expected to make interesting reading.

On the basis of questions from the bench, some members of the court are not in sympathy with the Federal Trade Commission's position. This position is that Standard will not be prevented by its order from continuing to sell to wholesalers in tank-car quantities at tank-car prices since it can insist that its wholesaler customers resell to retailers at not less than the posted tank-wagon price.

In the sharp questioning which followed this argument, it was made plain that some of the Justices saw here a conflict with the Sherman act, pointing out that if Standard did this it could be indicted for price maintenance.

While counsel for the company was questioned by members of the court, it was a light going over compared with that given James W. Cassedy, FTC associate general counsel, who spent so much of his time answering the bench that he was unable to complete his argument.

From the tenor of the questions many observers held the belief that the commission had lost its case. Neither Justices Minton, who wrote the lower court decision, or Douglas participated in the case, and it is believed the FTC may be on the short end of a 4-to-3 or even a 5-to-2 opinion.

The importance of the case lies in the issue of "good faith" in cutting prices to meet competition, one of the points in controversy in the O'Mahoney bill to legalize delivered prices and freight absorption which is due to come up in the Senate January 20.

Perimeter Defense

Recommendations by the National Security Resources Board and military officials that manufacturing plants of high war potential should be located in areas and under conditions which would minimize the dangers of bombing in the event of war seem to have precipitated a bitter intersectional fight.

Seizing the opportunity to build up manufacturing strength in interior states, a Mid-Continent Industrial Council was formed and has been using the security argument as a means of attracting new industries. The blow-up came when the council circulated a brochure among members of Congress advocating the removal of industry from coastal and border areas, which it pointed out are vulnerable to possible enemy attack.

Congressmen from the coastal and border states were immediately up in arms. They directed their criticism at the military thinkers and declared they "would not write off a single inch of U. S. territory."

Actually, even the most optimistic among the defense planners have no anticipation that existing industries which long have been centered in tidewater areas will pick up and move inland. Coastal oil installations, which would be a major object of attack in war, could not do so, both because of the tremendous cost of refineries and because their operations are based on water transportation and adjacency of markets.

Department of Justice to disclose the FBI files in the case.

The suit was originally filed by the Government on June 7, 1947, charging the Cotton Valley Operators' Committee, 15 corporatons, and 18 individuals with violations of the antitrust laws in the Cotton Valley distillate field in Louisiana.

The complaint charged that the defendants unlawfully agreed to engage jointly in and to exclude others from the business of extracting, processing and refining hydrocarbon products produced in the field; unlawfully agreed to engage jointly in and to exclude others from the business of distributing and selling those products through channels of distribution selected by them; and agreed upon fixed and uniform prices, terms and conditions of sale.

The defendants demanded that the Government disclose the information gathered by the Federal Bureau of Investigation in laying the groundwork for the case and when the department refused to open those files secured dismissal of the suit. The Government appealed to the Supreme Court with a view of testing the issue, which has been raised in several instances, contending that the secrecy of FBI files should be maintained.

Synthetic-Rubber Report

Truman asks 10-year continuance of Government operation of facilities, restrictions on sales to private companies

WASHINGTON.—Continuance of government operations for synthetic-rubber production for a period of 10 years, in the course of which facilities may gradually be sold to private operators, was recommended to Congress this week by President Truman.

The President's report, required by the Rubber Act of 1948 which expires next June 30, looked to gradual elimination of government supports and controls but pointed out that while a stockpile of natural rubber is being built it cannot be extended to the volume necessary to meet all emergency needs for rubber, and the synthetic industry, therefore, must be kept going.

Under the President's program, he would continue to have the present authority to designate the volume of synthetic rubber required to be used, and for the present, he said, at least one-quarter of total consumption of GR-S and natural rubber, and not less than 200,000 long tons annually, should be GR-S.

The situation with respect to butyl, he said, is somewhat different. Recent improvements make this superior to natural rubber for use in inner tubes, and it is probable that as soon as private production begins this type of synthetic rubber will be produced and consumed in adequate volume in a competitive market.

"It is my earnest hope that control on consumption of GR-S may be reduced or suspended over the next few years, as technological improvements result in increasing quantities of general-purpose synthetic rubber being consumed without government support," the President said. "This development should be stimulated by the disposal of the government's plants to private owners."

Report by Steelman.—The President's recommendations were based on a study made by Administrative Assistant John R. Steelman, in which it was emphasized that the present policy of top maintenance with respect to stand-by rubber plants is essential in the interest of national defense and should be continued, together with authority to the President to maintain in adequate stand-by such nonoperative producing facilities as he may designate.

Steelman's program called for authority to the President to establish the minimum level of production and consumption of synthetic and fix the proportion of general-purpose synthetic to be used in rubber products, together with such import restrictions on finished and semifinished rubber products as may be necessary to assure equality with like domestic products. The setting of the minimum level of production and consumption of butyl would continue only until one of the butyl plants has been sold to private industry.

The report also called for continuation of the Government's research in synthetic rubber, which could taper off as the plants moved into the hands of industry.

Sale restrictions.—A number of safeguards are proposed governing the disposition of plants to insure the continuance of synthetic-rubber production. A national-security clause requiring the maintenance of plants and equipment would be incorporated in any disposal agreement, and whenever mandatory usage requirements for general-purpose rubber are in effect, the Government would be authorized to direct the sale to meet mandatory-use requirements of a limited percentage of the capacity of each copolymer or butadiene plant sold or leased, and to direct the price and quality of the material so sold.

Copolymer or butadiene plants would be sold or leased only when disposal would be consistent with the development of effective competition, and at least one copolymer plant should be sold or leased for the production of general purpose rubber to a firm or firms determined by the President to be not dominant in the rubber-products manufacturing industry.

Steelman recommended that not more than 75,000 long tons of copolymer-plant design capacity should be sold or leased to any one firm for the production of general-purpose synthetic until at least 250,000 long tons of capacity have been sold or leased. He recommended also that no sale of both a butadiene and copolymer facility to a single concern should be permitted where such concern already controls one or both of the remaining two steps, in terms of vertical integration, in the ultimate production of rubber products from raw materials except upon a specific finding by the President that such disposal would be consistent with the development of effective competition. The four steps referred to are: (A) supply of feedstock for butadiene or styrene, (B) production of butadiene or styrene, (C) production of general-purpose synthetic and (D) manufacture of rubber products.

No more than one plant should be sold for the production of butyl to a firm determined by the President to be dominant in its industry, unless it is found that other disposal is impractical and that disposal to a dominant firm is in the public interest, Steelman said. He recommended that the Torrance, Calif., butadiene plant be turned over, if wanted, to the Air Force for use as a ram-jet testing facility, subject to requirements that the plant be maintained in adequate standby condition as long as necessary.

Chapman Approved

Nominee gets unanimous vote from committee

WASHINGTON.—A definitely friendly Senate interior and insular affairs committee questioned Oscar Chapman briefly January 16, mostly regarding Interior Department policies on Indians, reclamation and mineral development, and then unanimously voted to approve his nomination as Secretary of the Interior.

The department's policies with respect to oil were not touched upon except briefly by Chapman himself when, complimenting the committee on the help it has given the department, he said the synthetic liquid fuels research bill was one of its most important contributions.

Chapman added that he will ask for extension of that authority later in the session.

At several points in his discussion with the Senators, Chapman made

statements which inferentially covered oil as well as other matters, as when he declared the Government must step up development of the West and again when he asserted his belief that conservation "does not mean the locking up of reserves but their development in a wise way."

A number of Senators, Republicans as well as Democrats, expressed their satisfaction over the appointment of a secretary, for the first time in many years, who is familiar with the problems with which the department deals. Chapman has been in the department, as assistant secretary and undersecretary since May 4, 1933.

Also, it was commented by Sen. George W. Malone or Nevada, Chapman admitted he doesn't know everything, which the Senator said, will be something unique in a cabinet officer.

Cut in Freight Rates

WASHINGTON.—Admitting that they have priced themselves almost out of business, a number of railroad companies last week asked the Interstate Commerce Commission for authority to reduce their rates for the hauling of petroleum and products with a view to recovering some of the traffic which has been lost to over-the-road haulers.

Officials of railroads operating in the southeastern territory told ICC Examiner Charles W. Berry that since rates were increased last year a large part of their oil business has been lost to tank trucks. *(For changes in Group 3 rates, see The Oil and Gas Journal, January 12, page 35).*

Applications pending before the ICC provide for both the reduction of rail rates and an increase in truck rates, but representatives of the trucking interests, protesting that the two should not be linked, succeeded in having an investigation of their rates and charges set aside until a later date.

The situation is of interest in view of a warning by one member of the ICC when the last increase in freight rates was granted that the railroads could not expect to continue raising their charges and retain their necessary volume of business.

EASTERN

Attack on Gas

Natural-gas entry into northeastern market area strongly opposed before fuel-oil marketing organization meeting

BOSTON.—The prospective entrance of natural gas into the fuel market of New England was denounced last week by Joseph B. Wells, executive director of the Independent Oil Men's Association of New England, in a talk at the association's annual meeting here last week.

Wells told the membership of the oil-marketing organization that plans to transport natural gas into the area promise no economic advantage for New England and threaten the New England oil-distribution business of some 3,000 to 4,000 independent companies.

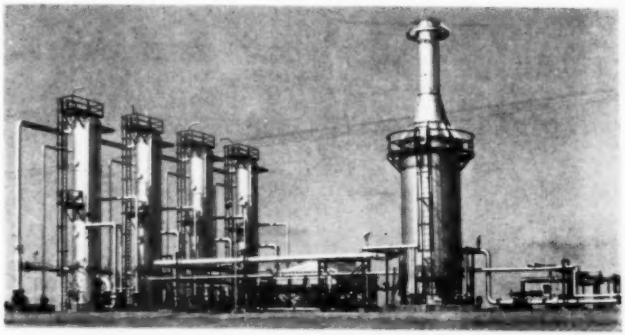
The association director referred critically to foreign-owned and controlled gas-transmission corporations which he said up to this point have been "enjoying the bonanza of buying gas at the wellhead mostly for from 3½ to 5 or 6 cents per 1,000 cu. ft. and selling it to utility companies for anywhere from 8 to 10 times such figures."

Serious disturbance of present petroleum refinery yield ratios as a result of natural gas could result in higher prices for other petroleum products, Wells said. "Refinery income sacrificed because of enforced defensive lower pricing on fuel oils must obviously be recovered by higher prices on the refinery products not affected," he said. "How can New England . . . or any other section . . . gain from uneconomically low prices on natural gas or on fuel oils if it then must pay more for its gasoline, lubricating oils, or other petroleum products which it consumes?"

Other factors.—Wells' attack on natural gas also was made on the basis of several other considerations, among them national defense and that of the basic saving for New England fuel consumers. Natural-gas projects for New England, Wells said, have been carried along thus far by promoters and advanced by propaganda. No savings from natural gas seems evident in home heating, but, Wells continued, experience in other sections has demonstrated that surplus natural gas is frequently dumped at any price it will bring after the domestic load at domestic rates has made the process solvent.

"The 1948 report of the U. S. Bureau of Mines clearly illustrates this point," he said. "This report shows that while the much-publicized economy of natural gas actually required an average national rate of 65 cents per 1,000 cu. ft. from the domestic user and a 44-cent rate from the commercial kitchen, the remaining supply (which was 75 per cent of the total sold) was dumped at the unbelievable average cut-rate price of 12½ cents per 1,000 cu. ft.

"A parallel to this in terms of our industry would be a portion of our customers sold No. 2 oil at 12 cents . . . with any unsold storage being dumped at 3 cents a gallon. Under antidiscrimination laws and Federal Trade Commission codes, we would soon find ourselves in hot water for such a practice. But transmission pipe-line companies and gas-utility companies, under monopoly franchise privileges,



IN FULL OPERATION.—Now operating at capacity is this Cities Service Gas Co. compressor station in Hugoton field. At left are the four dehydrators, each with a capacity of 100,000,000 cu. ft. daily, and at right the Petrochem furnace which dries out the desiccant in the dehydrator not in use. The station serves the company's 399-mile, 26-in. line from Hugoton to Kansas City and contains 13 compressors of 1,600 hp. each. The 26-in. line, last portion of which was completed late in 1949, now is carrying about 277,000,000 cu. ft. daily. Cities Service recently completed an extension of 16-in. to Independence.

pursue this economic distortion with immunity."

"Fantastic" plans.—The amount of natural gas planned for New England, Wells said, is a "fantastic" quantity. The 220,000,000 cu. ft. daily which Tennessee Gas Transmission Co. and Northeastern Gas Transmission Co. seek to bring into New England represents 20 per cent more 1,000-B.t.u. gas than New England's normal average daily consumption of 530-B.t.u. manufactured gas. "The fantasy inherent in this fact is evident to every business man in New England," Wells said. If every gas company in New England found it possible to increase its sales of gas B.t.u.'s as much as 25 per cent every year, it would be more than 10 years before even this initially proposed quantity could be absorbed."

Wells' discussion was the feature of the annual meeting. The association elected Horace E. Davenport, of George W. Pickering Co., Salem, Mass., as its new president.

GULF COAST

Tidelands Case Deferred

WASHINGTON.—Argument in the Texas and Louisiana tidelands suits has been deferred by the Supreme Court from February 6 to March 13.

The postponement is understood to have been decided upon so that a majority decision will be assured.

Two members of the court have disqualified themselves from participating in the case and Associate Justice Douglas, seriously injured in an accident last year, has not yet returned to his position on the bench. In his absence, there would be only six justices to decide the case, with the possibility of a three-to-three tie which, in effect, would be no decision either way.

Offshore Operations Base

NEW ORLEANS.—A site has been purchased by The California Co. on the Harvey Canal across the Mississippi River from this city to serve as a base for offshore and marsh operations.

The property was bought from Wilkinson Veneer Co. for $60,000. A steel sheet pile bulkhead will be built on the canal to handle LST drilling tenders such as the company uses for drilling in the Gulf of Mexico. The LST's are brought in about once a year for minor repairs and coast guard inspection.

The major function of the base will be for loading and unloading supplies. California formerly borrowed or rented dock space, but increasingly longer waiting periods made this impractical. A number of other operators use Harvey as an operating base. In addition, numerous supply and equipment companies have located there to make it an impressive oil center.

Chemists' Meeting

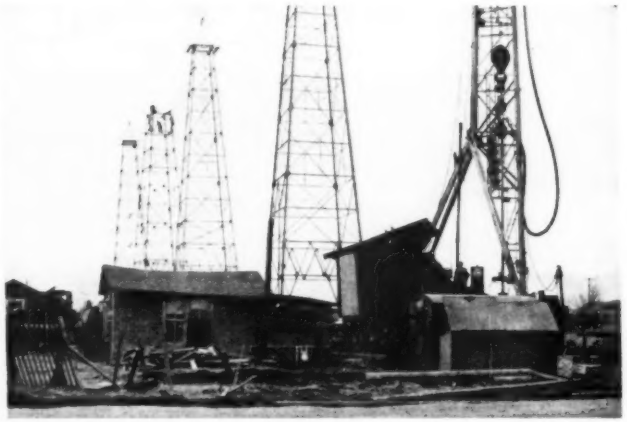
HOUSTON.—Although few strictly petroleum papers are scheduled, many refinery men are expected to be among the anticipated 600 engineers attending a regional meeting here February 26-March 1 of the American Institute of Chemical Engineers.

The group is returning to Houston for the second time in 4 years. In the interim Houston has developed into one of the world's largest chemical centers. At present the value of chemical plants in the area is estimated at $700,000,000. And this total does not include either the plant expansions now under way or the projected construction.

Mark Hopkins, of Pan-American Refining Co., is program chairman for the meeting and has divided it into sessions on phase equilibrium, waste disposal, ultrasonics, alkali-chlorine, and general subjects. William A. Cunningham, University of Texas, is chairman of the meeting by virtue of his chairmanship of the host South Texas section.

A feature of the meeting will be four informal discussion groups. Group chairmen and subjects of discussion are: R. L. Murray, Hooker Electrochemical Co., "Training of Chemical Plant Supervisors;" William T. Schambra, Dow Chemical Co., "Chemical Plant Surface Protective Coatings;" S. D. Kirkpatrick, Chemical Engineering, "What's New?;" and Carl F. Prutton, Mathieson Chemical Co., "Relations of Universities and Industry in Educating Plant Personnel."

Twenty-five technical papers by authors from all parts of the country are scheduled for the 4-day meeting. Field trips will be available to refining and chemical plants in the Houston area.



TOWN-LOT PROJECT.—The rigs pictured above are engaged in an active closely spaced drilling campaign within the city of Sherman, Tex. Production here is from the Strawn formation, at a depth of about 3,500 ft. Already 10 wells have been completed in the immediate vicinity. In addition to the rigs pictured here, another is being rigged up off the picture to the right, and two other strings are on the ground ready to be rigged up. All of the wells have been put on pump immediately after completion.

Tax Parley Suggested

BATON ROUGE.—A percentage-of-price basis of taxation rather than a fixed per-barrel rate has been suggested as a means of making Louisiana severance taxes more equitable.

Modification of the present taxation plan to this end is possible if oil-industry leaders would elect to talk with the state administration collectively through a competent spokesman, it was suggested here last week. State officials are said to be willing to discuss the present taxation system with petroleum spokesmen.

Suggestion of this passive method of alleviating unfair tax burdens rather than active participation in state political campaigns, was given in "Around the Capitol," a syndicated news column distributed throughout Louisiana. The suggestion was made after reports were circulated that "some elements" in the oil industry are considering a plan for all-out open political warfare in an effort to reduce severance taxes. Attempts of oil interests to get into state politics directly could only hurt the industry and the state, the column said.

EUROPE

Another Lost Market

New 5-year British bilateral agreement takes Yugoslavia off list of countries doing business with American firms

Dahl M. Duff

YUGOSLAVIA appears to have been added to the increasing list of countries where the oil market has been lost to American companies by a bilateral British trade agreement.

The British - Yugoslav agreement was recently signed in Belgrade. Included in the commodities to be supplied by Britain are crude oil and aviation and motor gasoline.

What it means.—The agreement runs 5 years through 1954, and the British have undertaken to provide Yugoslavia with 200,000 tons (about 4,000 bbl. daily) of crude this year, 150,000 tons (about 3,000 bbl. daily) in 1951, and 100,000 tons (about 2,000 bbl. daily) in each of the three succeeding years.

Officials of American oil companies reported there had been negotiations by Yugoslavia with American suppliers with State Department approval. They believe the quantities which the British agreed to furnish would meet virtually all the country's import requirements.

The decreasing quantities of crude apparently are set up on the expectation of an increase in Yugoslavia's indigenous production. The country has a refining capacity unofficially reported to be about 8,500 bbl. daily. The British agreement provides also for the supply by Britain of 30,000 tons (about 210,000 bbl.) of 70-72 octane motor fuel and 2,000 tons (about 14,000 bbl.) of aviation gasoline annually.

In return for its petroleum and a wide variety of other goods, including chemicals, crude rubber, and manufactured products, Britain will receive principally food products, timber, and nonferrous metals.

Though the quantity of oil involved is relatively small, American oil-company sources interpreted the agreement as another sign of the British determination to use expanded oil resources as the solution to its overall trade and currency problems, and with the effect of shutting American suppliers out of many world markets.

Optimistic view.—There was some slight optimism last week among officials of the American companies that the British may be induced to modify their course in the current discussions now taking place in Washington.

One executive said it appears that United States Government officials are now beginning to recognize the seriousness of the situation as it applies to overseas operations of American companies, operations which incidentally account for the largest single share of America's total foreign investment.

Ultimate results.—It has been frequently emphasized that the policies being followed by the British are extremely dangerous to themselves as well as the American operators. By curtailing progressively imports into the sterling area and refusing to allow transactions in sterling outside that area, the British could easily cause surpluses which would lead to uneconomic price reactions.

A two-price level for oil in international trade is one of the many possibilities which have been studied by the American companies. Barred from many normal markets, American suppliers might be forced into price concessions to dispose of their production.

The British, with an apparently assured market for their production, would not be required to follow such a move, as they only very reluctantly followed the two price reductions in the Persian Gulf during the last year. Two industry economists, however, discounted the likelihood of such a development, pointing out consuming countries would counter high-priced British oil with higher prices for their own exports to Britain.

Such discussions, as well as those of a preferential tariff against British oil into this country, greater acceptance by American companies of local currency of oil-consuming countries, and other possibilities, point up the statement of one official to the effect that the British are threatening the entire structure of the international oil trade with "chaotic conditions" as the likely result.

New German Discovery

The series of promising oil finds in Northwest Germany during the last few months has been continued with the discovery of oil near Eldingen, about 12 miles northeast of Celle, by Gewerkschaft Elwerath.

In a Lias sandstone at 5,250 ft. 1 Eldingen of Gewerkschaft Elwerath on production test flowed 25 cu. m. (about 157 bbl.) of light crude with high gasoline content. The well has been shut in due to lack of tankage.

It is estimated that a regular daily production of about 20 cu. m. (about 125 bbl.) can be expected. Like the recent Suderbruch discovery, the Eldingen well is on an intermediate structure not connected with salt domes.

Germany's Deepest Well

A new depth record for Germany has been established by Gewerkschaft Brigitta's Rodewald WA 400, which has been completed at 12,600 ft. south of Steimbke field in the Hanover area.

The company is jointly owned by Shell and Standard Oil Co. (N.J.), and a report from Germany said its drilling has contributed considerably towards the solution of a much-discussed problem in geology.

The well is 75 ft. deeper than the former deepest well in Germany, Holstein 14, near Heide in Schleswig-Holstein. The Rodewald well was drilled to investigate the subsaline Zechstein, and it was necessary to go through a salt thickness of about 6,000 ft.

The final outcome of the well depends on further investigation and measurements, according to the German report. It is reported that a new heavy rig of German manufacture was used in the operation.

Controlled Oil

Proposed Italian law to form state oil monopoly

THE new mining law which the Italian Government is expected to submit shortly to the Italian Parliament reserves to the Italian state organization, Azienda Generale Italiana Petroli (AGIP) a monopoly on further oil exploration and production in the Po Valley.

This has been confirmed in Italian business quarters, according to a recent report from Italy. The Italian Mining Association has protested to Premier De Gasperi and the Italian minister for foreign trade. The association called the government's attention to the possibility that the exclusion of foreign companies from exploration and production in the Po Valley might react in refusal to supply crude to Italian refineries and endanger the agreements between Azienda Nazionale Indrogenazione Combustibili (ANIC) and Standard

Oil Co. (N.J.) for reconstruction of the Bari and Leghorn refineries.

According to the reports from Italy, Italian military advisers to the Italian Government are behind the decision for a state monopoly in the Po Valley. This, in their opinion, represents a guarantee of liquid-fuel resources in the event of war.

It was said the Italian political situation is not fully appreciated by the representatives of American oil interests who fail to take into consideration the increased influence of the leftists as a result of the unemployment situation.

During the last few months, the Royal Dutch-Shell Group has been very active to show the Italians that their activities in Italy are fully in the hands of Italians.

French Financing Agency

France is planning to organize a new company in the near future to serve as the financing agency for the oil exploration program being carried out both in metropolitan France and the overseas territories.

The new company would be known as Soc. Financiere de Petrole which would be backed by three banks, Credit Lyonnais, Banque de Paris, and des Pays Bas, and Credit Commercial de France. Plans call for an initial capital of 500,000,000 francs and possibly 1,000,000,000 francs later.

While the French Government now holds large or controlling interest in most French exploration and production companies, it has not been decided if the government will take a majority of shares of the new company. In Paris, it was said the government would guarantee an interest rate not below 3½ per cent for the shares for the first 25 years.

Although there have been no outstanding successes in the French postwar exploration thus far, the Paris report said French experts believe a production of 12,000,000 or 15,000,000 tons a year, sufficient for French requirements, could ultimately be developed in French territory.

CANADA

Shell Obtains Reservations

Three Crown exploration reservations in Alberta, Canada, have been granted Shell Oil Co. through Shell Northern Exploration, Ltd. The most recent grant includes 36,326 acres in a 20 by 6 to 10-mile tract between Carstairs and Olds, Alberta, north of Calgary.

The two earlier reservations were one from Calgary to Crossfield of 98,080 acres, granted in November 1949 and a reservation west and north of Olds of 39,953 acres. The total acreage under reservation to Shell totals 174,359 acres.

LATIN AMERICA

New Colombian Decree

Amendment to oil law issued by military fails to excite oil-industry officials, not expected to increase activity

Dahl M. Duff

THE Colombian Government has promulgated a decree amending the oil law, but statements made in Bogota indicate its provisions fail to meet the industry's requirements.

The decree increases depletion allowances and provides a deduction of exploration investments. At the same time, it raises royalty rates and the surface-fee schedule and establishes a new fee for the commercial production period.

With martial law in effect in Colombia, the decree has the force of law. When martial law is lifted, the Congress must approve the decree if its provisions are to continue effective.

The law was called a measure to promote the investment of foreign capital in the Colombian oil industry, which has been marked by a decline in wildcatting and exploratory effort. However, the uncertain status of a decree-law and its failure to provide other reforms held to be necessary makes it doubtful that it will accomplish its stated purpose.

Industry view.—Dispatches from Bogota reported two executives there considered the decree had fallen short of the industry's expectations.

Leonard Toone, general manager of Cia. Shell de Colombia, said the decree as published could not improve conditions or stimulate new investment.

John O. Bower, manager for Texas Petroleum Co., said his understanding was the $10,000,000 invested by his company in exploratory work would continue to be taxed. He said the number of concessions that may be granted to a single company is still apparently limited to two since the new decree is silent on the subject.

Provisions.—The decree combines features of the proposals on both taxes and the oil law itself which had been submitted to the now-dissolved Congress by Dr. J. E. del Hierro, minister of petroleum. No action was taken by the Congress on the recommendations.

Colombia's royalty scale for existing concessions now varies from 2 to 11 per cent depending on pipe-line distance from the coast, with De Mares and Barco royalty set at a negotiated 10 per cent. The new schedule ranges from 3 per cent for areas near the coast to 13 per cent for the most distant sections. Royalty for Continental Shelf production, none of which Colombia has now, is increased from 8 to 10 per cent.

The new graduated surface-fee scheduling during exploration ranges from about 5 cents per hectare in the first year to about $1.53 in the tenth year compared to the old schedule from 5 cents the first year to $1.02 in the ninth year. The new fee during the commercial period is equivalent to about $1.50 per hectare per year.

The present depletion allowance of up to 5 per cent of net income is increased under the decree-law to a maximum of 20 per cent of net income, and parent companies are allowed a 5 per cent deduction of investments made in exploration directly or through subsidiary companies until commercial production is obtained. The ministry or the courts are to recognize private oil property with only a single action now required in the Supreme Court. The obligation to drill a wildcat was retained and to surrender an exploratory concession the operator must show that further work or drilling is not warranted.

Cuban Tests

Gulf Oil Corp.'s Cuban test drilled from a platform 2 miles offshore in Cardenas Bay now stands temporarily abandoned at a depth of 5,045 ft.

The well was spudded in August 13 and found considerable tar oil which, however, was not regarded as commercial. Gulf is continuing its exploratory work in the country and still has its crews and equipment available.

At the time the well was spudded it was reported that Gulf had selected three more locations for deep drilling.

Venezuelan Property Sale

A contract has been signed calling for the purchase by Creole Petroleum Corp. of the interests of North Venezuelan Petroleum Co., Ltd., in the state of Falcon in northwestern Venezuela.

The purchase is not expected to be finally closed for several months since various formalities in connection with the transaction have yet to be completed.

The properties involved consist of North Venezuelan's interst in Cumarebo field, producing about 2,000 bbl. daily, and in about 1,000,000 acres of

nonproducing land, including the Queque, Acosta, and Zamore concessions. It is reported Creole is committed to payment in oil over a period of 2 years with no cash involved.

Simon J. Vos, chairman of Trinidad Leaseholds, Ltd., which holds an interest in North Venezuelan, in his recent annual report, attributed the decision to sell the interests to the difficulties encountered by British firms operating in non-sterling areas such as Venezuela.

North Venezuelan has had an operating agreement for the concession area negotiated with the old Standard Oil Co. of Venezuela and later assigned to Creole as Standard of Venezuela's successor. Under this arrangement, Creole held oil rights on about 337,000 acres of the area for the joint benefit of the two companies.

Mexican Success

Wildcat tests 7,000 bbl. daily from two pay zones

COMPLETION in two good oil sands is being attempted in Mexican American Independent Oil Co. 1 Tortuguero, wildcat in southern Vera Cruz.

The two sands in which completion is being attempted produced at an estimated rate of 7,000 bbl. daily on short tests. One flowed at the rate of 100-150 bbl. hourly on an 18-minute test. The other produced at approximately the same rate on a similar test.

Complete data have not been released on the well, but it is known that three oil sands and one gas sand were penetrated.

Mexican sources said gravity of the oil is 36°, much higher than that produced in the old Agua Dulce field, 10 to 12 miles away.

Exact depths were not released on the two pay sands, but they are in the interval of 1,800-1,920 m. (5,904-6,298 ft.). Seven-inch casing was run and the operators were planning to perforate in the two sands.

The sands are believed to be of lower Miocene age, with possibly a portion of the lower sand in the upper Oligocene.

A Mexican American spokesman said future drilling plans have not yet been made. The company, he said, will evaluate the discovery well thoroughly before settling on a drilling program.

The 1 Tortuguero rig is situated on the beach near Coatzcoalcos, with the well bottomed between 2,000 and 3,000 ft. offshore. A Mexican source said that upon completion the rig would be skidded to a new location and another deflected hole begun.

Wildcat report.—Mexican American's other drilling operation, a rank wildcat at Xicalango, near Ciudad del Carmen in the State of Campeche, was reported drilling ahead this week below 4,000 ft. after encountering a strong show of gas.

The rig is located about ½ mile from the Gulf of Mexico in heavy jungle.

Both wells are being drilled on structures mapped by American Exploration Co. They are being drilled for Mexican American by Kerr-McGee Oil Industries, Inc.

Amuay Bay on Stream

Creole Petroleum Corp.'s new Amuay Bay refinery in northwestern Venezuela went on stream January 4 running crude at nearly its full rated capacity of 63,000 bbl. daily.

Commencement of operations was made possible by completion of the atmospheric pipe still. Work is continuing on other process units. A vacuum still is to be finished in the third quarter, and an asphalt plant is to go on stream in the next few months.

As a result of the opening of the new Amuay Bay refinery, Creole has closed down its skimming and asphalt plant at La Salina on the east side of Lake Maracaibo. The plant is scheduled eventually to be dismantled. With a rated capacity of 10,000 bbl. daily, La Salina in November ran an average of 18,037 bbl. daily.

Creole's Amuay Bay refinery, largest in Venezuela, represents an ultimate investment reported at about $150,000,000. It is a major part of the current refinery-construction program now under way which will make Venezuela the worlds' fifth largest refining country.

Creole is expected to formally inaugurate the Amuay Bay refinery next month with an inspection trip by a selected group of industry and government officials.

Chilean Oil to Uruguay

The first sales contract for the export of Chilean petroleum to Uruguay has been closed, according to reports from Santiago.

Under the contract, sales will reach 1 million barrels a year, valued at $2,000,000. Exports to Uruguay are scheduled to commence in February. The crude will come from the Chilean Corp. de Fomento's field in Tierra del Fuego, recently placed on commercial production, and will presumably be refined in the 15,700-bbl. daily plant of Administracion Nacional de Combustibles, Alcohol y Portland, near Montevideo.

FAR EAST

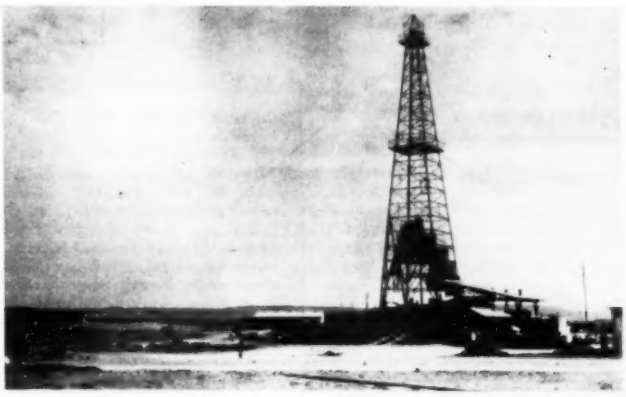
Labor Unrest

Work stoppages result from strikes in Sumatra

THE 64,000-bbl. daily refinery of Standard-Vacuum Petroleum Mij. near Palembang in South Sumatra was closed down January 9 as a result of wildcat strikes among its Indonesian employes.

The disturbances, which appeared to be a part of the general social and political unrest now evident in Indonesia, began January 9. When these sitdown strikes spread 2 days later to process operations, the refinery was shut down as a precautionary safety measure.

The refinery is the second largest



This well is the Lakhra deep test of Burmah Oil Co. (Pakistan Concessions), Ltd., in the Sind Desert of southern Pakistan. Last reported below 10,900 ft., it is the deepest well ever drilled in the Indian subcontinent. Several gas shows have been encountered.

in the Far East. Pipe-line runs from the producing fields were curtailed, and production was expected to be affected seriously if refinery operations are not soon resumed.

Conferences aimed at a settlement were under way involving the company, government representatives, the employes, and a union which has been attempting to organize the refinery. The workers were said to be demanding 50 to 100 per cent wage increases, paid annual holidays, triple overtime, and traveling expenses. A Standard - Vacuum representative in Jakarta (Batavia) said wages now paid are 20 per cent higher than those prevailing.

Other reports told of similar disturbances as well as guerilla violence elsewhere in Indonesia which less than a month ago was granted independence from the Dutch. Shipping, tobacco, and soap manufacturing were affected. Fighting flared up between Indonesian regulars and guerillas, and Borneo dispatches said 13 were killed in the area of Balik Papan where a 9,300-bbl. daily Shell refinery is located.

Burma Oil Convoyed

The largest oil convoy to reach Mandalay since the Burma insurrections began recently arrived safely, according to an announcement by Burmah Oil Co. (Burma Trading), Ltd., in Rangoon.

Mandalay gets most of the oil products made at the Chauk topping plant in the Burma fields. Convoys escorted by the Army have been necessary because of the civil disturbance in Burma, and since August more than 1,000,000 gal. of products have been safely conducted through insurgent-held areas in four convoys.

The products are barged up the Irrawaddy River to Mandalay from the fields in central Burma. The latest shipment totaled 481,331 gal. and included gasoline, kerosine, and diesel fuel.

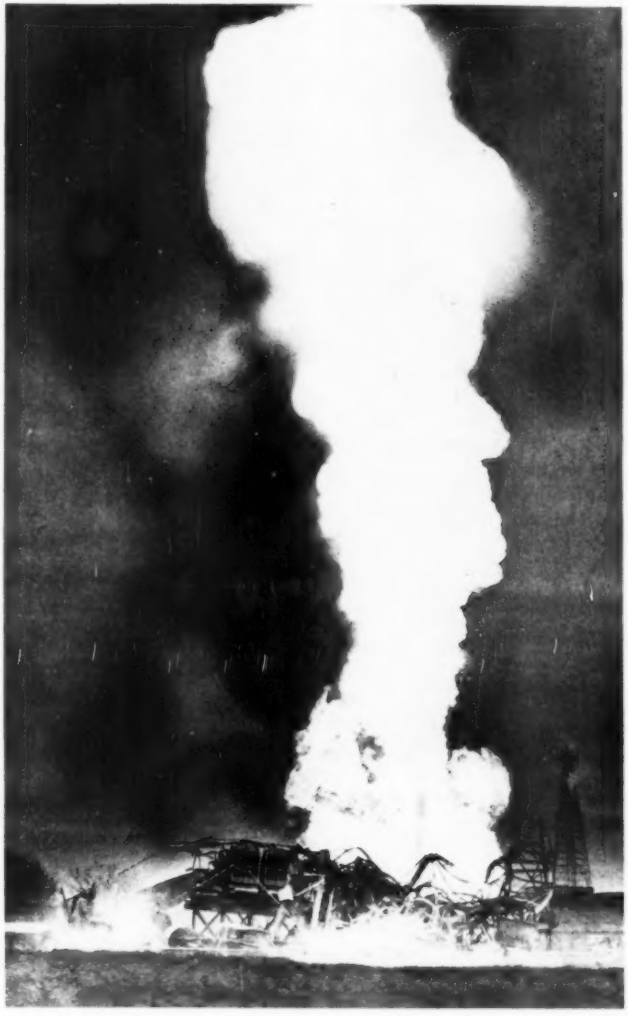
AUSTRALIA

Increased Imports

The new Australian Government is continuing its efforts to arrange for sufficient gasoline supplies to end rationing of the product in that country.

The Australian external - affairs minister left Sydney recently for Jakarta (Batavia) and said he would investigate the possibility of increasing gasoline imports from Indonesia.

Gasoline rationing was a political issue in the recent general election in Australia, and the new government is committed to ending it. Since last summer Australia has considered imports from Poland, from Russia, and from France.



IN HIGH-PRESSURE FIELD.—This spectacular blaze in Elk City field, Oklahoma, began on January 10 when drilling tools hit gas of unpredicted pressure, which blew out and ignited. The fire was being fed by an estimated 40,000,000 cu. ft. of gas and 300 to 400 bbl. of condensate a day from a depth of nearly 9,700 ft. The lease on which the well was being drilled is owned by Shell Oil Co. and drilling tools belong to Helmerich & Payne, Inc., Tulsa.

The mass of twisted molten metal shown at the base of the tower of flame was formerly a heavy rig, which, with the remainder of the drilling equipment was reportedly valued at $435,000. Removal of this debris began last Friday and was completed by Sunday when the first attempt to "shoot-out" the fire was made by M. M. Kinley, Houston firefighter. The first jellied-nitro shot did snuff the fire, but it reignited soon afterward, probably from white-hot metal accidentally left near the well. Preparations began immediately for a second shot scheduled for Monday, but flames began to die Sunday night and stopped unaided, early Monday.

Elk City field is the largest drilling operation and the most rapidly developing field in Oklahoma. It produces 52°-65° A.P.I. gravity condensate with large quantities of gas from the Granite Wash on the northern flank of the Anadarko Basin. The first well was drilled in 1947, but active development waited until 1949 when heavy rigs became available in quantity. Currently there are 22 rigs active in the field. The Granite Wash at Elk City is extremely thick and erratic. Bottom-hole pressures are high, probably varying from 3,800 to 4,300 psi.

Scurry Scramble

Wentz sale of 28,000 acres highlights week's activity

Carl F. Hoot

DALLAS.—The scramble for acreage in Kent County, Texas, just north of the proven area of Canyon Reef which runs through Scurry County, has resulted in the announcement of several large deals.

The play was accentuated when production was found in Canyon Reef by J. A. Chapman Producing Co. 1 D. M. Cogdell, Section 716, Block 79, H&TC Survey, Kent County, just across the Scurry County line. *(See The Oil and Gas Journal, December 22, 1949, pages 132 and 303.)*

Wentz sale.—Last week Barnsdall Oil Co. and Seaboard Oil Co. jointly acquired from the L. H. Wentz estates a block of 27,000 acres in Kent County and 982 acres in Scurry County. The total deal involves more than $5,000,000 in cash and $5,000,000 out of one-sixteenth of the oil produced. On the Scurry County portion there are already two producing wells and a location staked for a third.

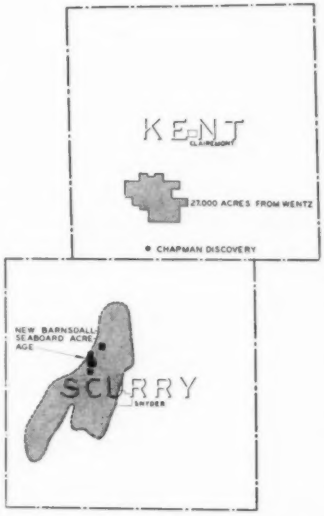
The Scurry properties include the NE¼ Section 339; N½ Section 296; NW¼ Section 293; and W½ of Section 337, all in Block 97, H&TC Survey. The two producers are in the NE¼ Section 339, on the west side of the North Snyder producing area. The Kent County 27,00 acres lie in large part in Block 4, H&GN Survey, about 3 miles north of the Cogdell discovery.

Lohman deal.—Lewis T. Lohman, Trustee, a Dallas operator, announced the turn of a spread of acreage in 17½ sections of the Jones ranch (formerly Atkins), in central Kent County, to Heyser & Heard of Dallas. The acreage involved lies in Block 5, W&NWRR Survey, and lies north of the Wentz tract.

Heyser & Heard agreed to drill three wildcat tests all the way to the Ellenburger, although the Canyon Reef is the main objective. Out of each section, Heyser & Heard is to get a 160-acre lease in return for the drilling of the three wells. The first is scheduled to start drilling by February 15. Location has not been announced, but the first test is expected to be in the southern part of the block, probably in either Section 42, 43, or 44, about 10 miles north of the Scurry-Kent county line.

Farmout wildcat.—Sohio Petroleum Co. was scheduled to drill a wildcat on the J. W. Young ranch, adjoining the Jones ranch on the northwest. This test is on a 1,280-acre farmout in Sections 100, 117, 116, 87, and 71, from Spartan Drilling Co., Lone Star Producing Co., and Signal Oil & Gas Co.

The 1,280-acre farmout is composed of NW¼ Section 116, N½ of Section 117, N½ of Section 100; N½ of Section 87; and NW¼ of Section 71, all in Block G, W&NW Survey.



Map showing location of leases in the $10,000,000 cash and oil deal made by Seaboard and Barnsdall with the Wentz estate. In Kent County, shaded area represents block acquired. In Scurry County, solid black areas are those involved in the purchase. Shaded area in Scurry County represents outline of area of presently proven reef production.

Cheaper Insurance

$1,000,000 saving seen for oil industry in new rates

D. H. Stormont

DALLAS.—The Texas oil industry's bill for workmen's compensation insurance will be cut about $1,000,000 during the next year, according to the new schedule recently announced by the Texas Board of Insurance Commissioners. This saving was made possible through a rate decrease of 8.1 per cent, effective February 1.

For Texas industry as a whole, workmen's compensation rates will be reduced 7.5 per cent from the existing premium level, or a savings of about $4,350,000 to Texas employers. Thus, after February 1, rates will have declined a total of about 41 per cent since 1938, despite an 11 per cent increase in benefits granted under a 1947 Texas law.

The new rates correspond to the filing made by the Texas Employers Insurance Association at the November 30, 1949, hearing of the Texas Board of Insurance Commissioners. At the same hearing the National Council of Compensation Insurance asked for an average rate increase of 4.2 per cent.

As is shown in the accompanying table, rates for the individual codes or classifications varied widely from the industry-wide average of 8.1 per cent. For example, rates for Code 6209, covering oil rig or derrick erec-

Next Week

ANNUAL REVIEW AND FORECAST NUMBER

AN optimistic outlook for the petroleum industry during 1950 runs through the forecasts now being put into final form for the Journal's annual feature which will appear in the next issue.

Past records and future predictions, based on careful compilation of statistics and the actual programs of operators, will be presented in summary and in detail covering all phases of the oil and natural-gas industry.

Particularly optimistic are reports on demand for petroleum products during 1950, drilling activity scheduled, and pipe-line construction. On the whole, the issue will show, activity throughout the industry will be on a high level, passing 1949 in some aspects, slightly under in others.

Detailed records of 1949, with comparisons with previous years will be presented on wildcatting, drilling, discoveries, reserves, pumping, production, refining, product demand, natural gas, light hydrocarbons, pipe-line and refinery construction, and other activities of the industry.

Also a breakdown of refinery operations, a study of major fields, the completions record by states and counties, and the many other features which have made this number a year-around reference book for the industry.

WORKMEN'S COMPENSATION RATES, OIL AND GAS CLASSIFICATIONS (FOR EVERY $100 OF ANNUAL PAYROLL)
(Figures in dollars)

Code No.		Incl. occupational disease		
		Feb. 1, 1949 rate	Feb. 1, 1950 rate	Change
1321	Oil or gas producing	$2.36	$2.08	— .28
1322	Oil or gas well servicing	7.62	6.71	— .91
1330	Oil or gas well shooting	8.52	7.77	— .75
4739	Recycling plants, all operations	1.55	1.59	+ .04
4740	Oil refining, petroleum	1.68	1.38	— .30
4741	Asphalt or tar distilling or refining	3.50	3.28	— .22
4743	Gasoline recovery, from casinghead or natural gas	1.53	1.21	— .32
4750	Synthetic rubber intermediate manufacture	2.10	2.19	+ .09
4751	Synthetic rubber manufacture	1.93	1.71	— .22
6044	Clearing and grading of land (not otherwise classified)	2.81	2.37	— .44
6202	Oil and gas wells—drilling or redrilling	7.96	7.33	— .63
6204	Drilling NOC	4.77	4.77	
6206	Oil or gas wells, cementing (also acidizing)	4.37	3.56	— .81
6209	Oil rig or derrick erecting or dismantling	11.49	8.62	—2.87
6210	Oil or gas wells—installation or pulling of casing	17.96	18.33	+ .37
6213	Oil or gas wells—specialty tool operation NOC—by contractors	2.52	2.08	— .44
6214	Oil or gas wells—perforating or casing	2.52	2.08	— .44
6216	Oil or gas lease work NOC—by contractors—not lease operations	3.92	4.26	+ .34
6233	Oil or gas pipe-line construction	6.93	7.37	+ .44
6237	Oil or gas wells—instrument logging or survey work in wells	1.07	1.09	— .02
7222	Hauling of oil-field equipment	10.00	9.67	— .33
7502	Gas companies—natural gas—local distribution operations	1.09	1.20	+ .11
7515	Oil or gas pipe-line operation	.95	.96	+ .01
8113	Oil well equipment dealers—second hand	5.48	4.33	—1.15
8350	Gasoline or oil dealers	2.18	2.31	+ .13
8352	Butane, propane, and other L.P.G. dealers	2.14	2.31	+ .17
8604	Geophysical—seismic method	2.24	1.95	— .29
8605	Oil or gas geologists or scouts	.42	.39	— .03
8607	Geophysical exploration NOC	.51	.39	— .12

tions and dismantling, declined from $11.49 to $8.62 per $100 annual payroll. In some classifications, where the accident-frequency experiences have been higher, slight increases will be made.

In many instances the decrease in new premium rates was due to the use of a "wage-trend factor," which takes into consideration the difference in wages paid at the current time and during the period when the accident frequency was experienced. Premium rates for 1949 were based on experiences in 1946-47. In that period the average wage paid in the oil industry was $9.56 per day; last year the average daily wage was $11.11. Application of this factor resulted in an average decrease of 8.7 per cent.

In the case of oil and gas well drilling, Code 6202, premium rates will be reduced from $7.96 to $7.33 per $100 annual payroll. The 1949 "pure premium" rate, which amounts to 60.8 per cent of the total premium, was $4.84. If the wage-trend factor had not been applied, 1950 rates would have been about 8 per cent higher than last year's because such a raise was indicated in the accident-frequency experiences in the 2 years (1946 and 1947) on which the 1949 and 1950 rates are based.

East Texas Price Cuts

Heavy-crude price adjustments have been made in four East Texas fields by Pan American Production Co. The new schedule calls for $1.93 per barrel for 19 to 19.9 -gravity oil with a 4-cent decrease per degree gravity to $1.61 for oil below 12 gravity.

Affected fields are Manziel (heavy) with a 600-bbl. per day allowable; Merigale-Paul with 4,500 bbl. per day, and Quitman (heavy) with 4,600 bbl. per day, all in Wood County; and Cayuga field in Anderson County with a daily allowable of 5,500 bbl. per day.

Gas-Allowable Study

AUSTIN.—The Texas Railroad Commission will review its proration rules for Texas-Hugoton and West Panhandle gas fields January 25 with a view to cutting allowables to actual pipe-line demand.

The hearing is to be held in Amarillo. It will seek to determine, the commission said, whether conditions exist in the fields to make it necessary "to adjust allowed production . . . to the actual bona fide demand for gas produced, as evidenced by actual production."

Index Ready Soon

The complete editorial index of The Oil and Gas Journal for 1949 is now in preparation and will be ready for distribution at an early date. It will list articles published during the year by titles grouped by subject matter, and with cross-references, and also an index of authors. Bound separately, it will be mailed without charge to any subscriber requesting a copy. Address requests to Circulation Department, P. O. Box 1260, Tulsa.

In announcing plans for the hearing, the commission said that between October 1, 1948, and August 31, 1949, Texas-Hugoton operators had an accrued underproduction of 6 billion cubic feet and West Panhandle operators had an accrued underproduction of 50 billion cubic feet.

This underproduction, the commission said, has not been accumulated proportionately among all operators according to the percentage of field production assigned them.

Counties affected include Sherman, Moore, Hansford, Carson, Gray, Hartley, Hutchinson, Moore, and Potter.

Louisiana Review

BATON ROUGE.—Drilling permits issued in Louisiana during December totaled 227, a drop from 276 in November, and brought the 1949 permit total to 2,607, according to Conservation Commissioner S. L. Digby.

December completions totaled 252, compared with 181 in November, and made the year's total 2,251. Of the December figure 204 wells were productive, making that annual figure 1,788.

Oil-well completions in December totaled 156, making 1,411 for the year; gas wells last month totaled 156, making 377 for the year; and dry holes totaled 48, making 463 in 1949.

Murray to Seek Reelection

AUSTIN.—William J. Murray, Jr., Houston, chairman of the Texas Railroad Commission, will be a candidate for another 6-year term on the commission, he has announced.

Murray, a Houston engineer, was appointed a member of the commission in 1947 by Gov. Beauford Jester. He ran for election in 1948, but only to serve out Jester's unexpired term. In this year's race he will be seeking his first full term on the state body, of which he has been chairman since last January.

Purchase Cut Withdrawn

FORT WORTH.—Premier Oil Refining Co. has rescinded the 60 per cent crude-purchase cut it announced January 5.

The company went back on its full purchasing schedule upon request of the Texas Railroad Commission and crude producers in West-Central Texas. Purchases were continued pending a statewide allowable hearing this week.

Sylvester Dayson, Premier's president, explaining the purchase curtailment, said: "Countries receiving American economic aid have been allowed to push American oil and products out of their usual foreign markets, leaving the way clear for a flood of cheap foreign crude and products into the United States where

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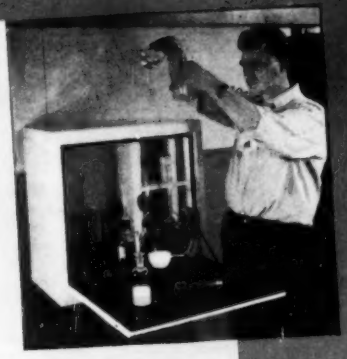

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they are replacing American production." Dayson partly blamed excessive pipe-line rates and congestion of storage for the purchase cut.

A storm of protest from producers followed Premier's reduction announcement. The West-Central Texas Oil and Gas Association filed a protest with the Railroad Commission asking it to take action in the matter. The producers said that the cut would "result in the abandonment and in the loss of millions of barrels of otherwise recoverable oil."

Large Exploration Lease

Magnolia Petroleum Co. has leased 85,000 acres in Walker and San Jacinto counties, Texas, from Central Coke & Chemical Corp. for exploration purposes.

Magnolia has option, under terms of the lease, to select at the end of a year tracts of 2,000 acres of mineral rights of any of the leased land for a bonus of $5 an acre. Primary terms of the lease call for a term rate of $1 an acre.

MID-CONTINENT

Hugoton Interests Sold

GARDEN CITY, Kans. — Magnolia Petroleum Co. last week sold 75 per cent of its working interest in more than 100,000 acres of producing leases in five counties in Hugoton field.

Purchaser was G. M. B. Oil Co., Dallas. Purchase price was announced as approximately $10,000,000, to be paid for out of gas production.

The leases involve 800 quarter sections in Finney, Kearny, Grant, Stevens, and Haskell counties.

Big Drilling Program

OKLAHOMA CITY.—Five rigs this week had begun operating on a 100-well drilling program in the Texas and Oklahoma panhandles.

Tascosa Gas Co., a new company formed for the 2-year project, is drilling the wells on a farmout from Phillips Petroleum Co. Tascosa officials here said Phillips is retaining an "overriding interest" in the farmout.

Involved in the project are 100 scattered sections in Hansford and Sherman counties of Texas and Texas County in Oklahoma. The area lies at the southern tip of the huge Hugoton gas field.

Tascosa plans to complete 60 wells during 1950 and the remaining 40 in 1951.

Gas from the wells will be taken by Phillips and delivered to Michigan Wisconsin Pipe Line Co. The Michigan-Wisconsin line delivers gas to Detroit and Milwaukee.

Owners of Tascosa are Robert S. Kerr, T. M. Kerr, Dean McGee, T. W. Fentam, Frank C. Love, and Dean Terrill.

Harder Geology

Better knowledge of seismic work needed, A.A.P.G. told

OKLAHOMA CITY. — The seismograph "honeymoon" in oil exploration is over.

The easy areas and "fat" structures already have been thoroughly prospected, the Mid-Continent regional meeting of the American Association of Petroleum Geologists was told here last week by B. W. Beebe, Anderson-Prichard Oil Corp.

It has become mandatory, Beebe said, that the geologist have a thorough understanding of the principles, problems, procedure, and limits of seismic exploration as the industry is forced to prospect more marginal areas where data are difficult to secure and interpret and where the results are near the limit of accuracy.

The seismograph, after 20 years of use, Beebe said, still is the most important mechanical device available, but its employment and the interpretation of observations leave much to be desired.

"The primary responsibility in any geophysical exploration program with the object of locating commercial deposits of petroleum is, and must be, jointly that of the geologist and geophysicist," Beebe said.

"Geologists as a group have failed to recognize and assume their full share of the responsibility insofar as geophysical prospecting is concerned," he added.

In spite of the fact that many geologists have successfully entered the field of geophysics, exploration geologists as a group have not assumed the responsibility for correlating their work with the work of geophysicists and assumed their full share of the direction of the exploratory program, Beebe asserted.

The history of Scholem Alechem field, from its discovery in 1923 to its present role as Oklahoma's second largest field, was described by H. R. Billingsley, of Atlantic Refining Co., Shawnee.

A minor field for 24 years, the pool was boosted to its present major status with the discovery of the deeper Springer sandstone in 1947. Development in this zone, Billingsley said, raised the field's output from 706,853 bbl. in 1947 to 4,989,845 bbl. in 1948.

The only field with a greater production in the state now is Velma field, in southern Oklahoma.

J. B. Moorhead, of Continental Oil Co., Wichita Falls, Tex., speaking on the geology of the Fort Worth basin, predicted that new basin oil yet to be found will be greater in quantity than either the amount produced to date or known reserves in place.

Oil fields at present are relatively small in areal extent but are economically profitable, he said.

The basin is a regional syncline of North Central Texas, about 150 miles long and ranging from 0 to 70 miles in width. Paleozoic sediments of Cambrian, Ordovician, Mississippian, and Pennsylvanian are found, he said, with greatest thickness being noted in the Ellenburger and Strawn groups.

Production to date, he told the geologists, has been largely governed by structural conditions, affected by local porosity variations.

Unit Application

Application for unitization of 640 acres of the Layton sand zone in Northwest Perry field, Noble County, Oklahoma, to the Oklahoma Corporation Commission, has been made by operators in the field. There are now 13 producers from the Layton which is found at about 3,800 ft.

Operators include Warren Oil Co., Clark & Cowden Drilling Co., Gardner Petroleum Co., W. J. Mouser, Paul C. Teas, Bess Gillett, C. W. Gillett, J. B. Umpleby, and Stuart S. Umpleby.

Partnership Dissolved

OKLAHOMA CITY.—Kirkpatrick & Bale, Inc., an independent oil company with production in Carter, Pontotoc, Seminole, and Hughes counties, is being dissolved as a partnership.

Hubert E. Bale & Co., an affiliated consulting firm, also is being dissolved.

Under an agreement, John Kirkpatrick, one of the partners, will continue operating under the firm name, retaining one of the company's rigs and operating leases in Carter County. Bale will take over leases in the other three counties and use another rig in drilling-contracting work.

LABOR

O.W.I.U.'s 1950 Goals

Two principal objectives for 1950 of the Oil Workers International Union (C.I.O.) will be reestablishment of the 36-hour work week and a reduction in imports, the union has notified its members.

A drive to obtain pensions was listed as a third objective.

Explaining its stand on imports, the union said that many layoffs have been made in recent months and that these were largely due to "heavy importation of foreign crude oil and refined products." "Some layoffs," the union said, "reflect the desire of some oil-company managements to obtain maximum results for a minimum cost —often without due regard to the safety of the employes involved."

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PERSONALS

Directs Pipe Lines

Supple takes over as head of General's system

GEORGE H. SUPPLE, manager of the pipe-line department of General Petroleum Corp., Los Angeles, has taken over his new duties as vice president and director of pipe lines for the company, succeeding J. L. Martin, who retired recently.

Supple's latest appointment follows more than 25 years of service with General Petroleum, the last 15 of which have been spent in its pipe-line department.

A native of Michigan Valley, Kans., Supple attended the University of Kansas, receiving a bachelor of arts degree. He later took postgraduate work at the University of Chicago, and in 1924 joined General Petroleum as an accountant in the controller's department.

Named section chief of that department in 1935, he was transferred to the pipe-line department as assistant to the manager a year later. He became manager of the pipe-line department in 1948.

During World War I Supple served overseas with the Thirty-Fifth Division, U. S. Army. He is a member of Phi Beta Kappa fraternity, American Petroleum Institute, and National Association of Corrosion Engineers.

John R. Gisborne and **A. J. Newmyer, Jr.**, have been named to the geological staff of Skelly Oil Co.'s West Texas-New Mexico district, with headquarters in Midland. Gisborne formerly was with **George P. Hardison**, independent operator, in Wichita Falls, and Newmyer was with the U. S. Army Engineers at Pittsburgh before joining Skelly.

Edward B. Harry, engineer for Sohio Petroleum Co. at Holyrood, Kans., has been transferred in a similar capacity to the Sulphur, Okla., area.

H. E. Freeman, formerly supervisor for Sun Pipe Line Co. at Crossville, Ill., has been transferred to Delhi, La., as supervisor in the pipeline department, Sun Oil Co.

S. C. Sandusky, reservoir engineer at Casper, Wyo., for Ohio Oil Co., is now serving the company as assistant petroleum engineer in Houston.

H. E. Elmasri, mechanical engineer, Anglo Egyptian Oilfields, Ltd., Cairo, Egypt, is now in the United States visiting the various oil centers and fields. He visited Houston recently and from there went to California.

C. G. Morrison, assistant head of the maintenance and construction department in charge of field coordination, Esso Standard Oil Co.'s Baton Rouge refinery, has been named assistant process superintendent. Other changes in personnel at the refinery include: **Fred Kring, Jr.**, assistant process superintendent, named superintendent of refining and oil movement; **Dr. D. F. Edwards**, superintendent of refining and oil movement, named superintendent of the paraffin and lubricating department; **W. G. McAndrew**, superintendent of paraffin and lubricating department, named superintendent of package and shipping and oil conservation; **W. C. Clark**, package and shipping and oil-conservation superintendent, named assistant manager of employe relations; **Dr. J. P. Cogan**, head of process engineering, named assistant head of the technical division; **Dr. F. A. L. Holloway**, assistant head of the technical division, appointed head of petroleum technical service; **D. O. Swan**, petroleum technical service head, named general foreman of catalytic cracking; **J. F. Wright**, head of cost analysis, named head of process engineering; **P. G. Slachman**, coordinator of contracts, named cost-analysis head; **E. R. Wilkonson**, assistant employe-relations manager, named assistant head of maintenance and construction in charge of crafts; **E. G. Miller**, assistant head, maintenance and construction in charge of crafts, named assistant head of refinery services; **G. A. Stein, Jr.**, catalytic cracking foreman, named assistant head of maintenance and construction, field operations; **Dr. J. W. Wood**, general foreman of alcohol plants, named coordinator of contracts; **Dr. M. C. Fuqua**, group head, chemical - products laboratory, appointed general foreman of alcohol plants; **R. F. Howe**, assistant head of the chemical - products laboratory, named section head of petroleum technical service in charge of refining and cracking; **Dr. C. T. Steele**, section head, petroleum technical service, in charge of refining and cracking, named assistant head of the chemical-products laboratory; **C. D. Singer**, foreman, light ends and polymer, named section head, petroleum technical service, in charge of paraffin and lubricating oils; **A. C. Matthies**, section head, petroleum technical service, in charge of paraffin and lubricating oils, appointed foreman of light ends and polymer; and **M. R. Grosz**, cost analysis, named assistant head of yield and cost.

Donald N. Claflin has been appointed chief research technologist for the Houston refinery of Shell Oil Co., transferring from the Wood River, Ill., refinery. A chemical - engineering graduate from the University of Illinois, Claflin started with Shell at Wood River in 1936, and has held positions as technologist, experimental laboratory chemist and engineer, manager of the effluent department, and head of the experimental laboratory.

Herman Loeb, geological scout for Union Producing Co. in the Shreveport office, has been transferred to the North Texas-Oklahoma area, with headquarters at Wichita Falls, Tex.

H. J. Struth, petroleum economist, has resigned as assistant director of information for American Petroleum Institute, and is returning to Dallas, where he will open his own office as a petroleum consultant and economic advisor. Before joining A.P.I. in New York City, Struth was with the Texas Mid-Continent Oil and Gas Association at Dallas.

Fred J. Shipley, Texas Railroad Commission, Houston, has been elected president of the Houston Oilmen's Club. Other officers include: **I. O. Walker**, Pan American Pipe Line Co., vice president; **J. B. Waller**, Pure Oil Co., secretary; and **A. D. Wilbur**, Humble Pipe Line Co., chairman of the board of directors. Members of the board elected were: **Joe Owens**, Sun Pipe Line Co., **John I. Watson**, Federal Petroleum Board, **V. D. Griffin**, Pan American Pipe Line Co.,

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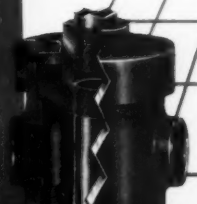

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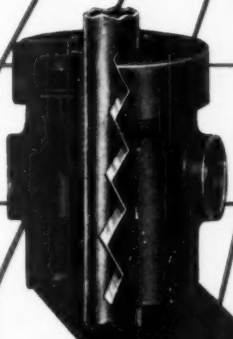

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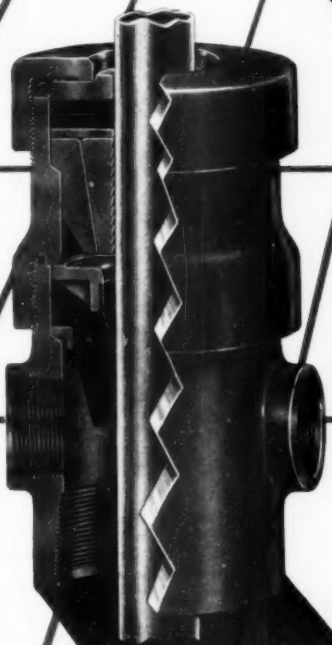

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PERSONALS

R. C. Huder, Anchor Oil Co., **Sam Lucas**, The Texas Co., and **L. S. McCaslin, Jr.**, The Oil and Gas Journal.

Bill Laves, formerly a geologist with Hubert E. Bale & Co., geological and engineering consulting firm which recently was dissolved, has established an office in Oklahoma City as consulting geologist.

P. W. THIRTLE

P. W. Thirtle, general auditor and comptroller of the parent Sinclair company since its formation in 1916, has been elected a director of Sinclair Oil Corp. He succeeds **Alvin Untermyer** who resigned after 20 years' association with the Sinclair company and whose work was praised in a resolution adopted by the Sinclair board. Thirtle has been a vice president not only of Sinclair Oil but also of various subsidiary companies.

J. L. Lee, design engineer for Standard Oil Co. of California at San Francisco, has been transferred to Barber, N. J., as supervisor of designs of offsite facilities and refinery expansion for California Refining Co.

Marshall Dayton, petroleum engineer at Corpus Christi, Tex., for Sun Oil Co., has been moved to Premont, Tex., in the same capacity.

George M. Clement, Houston, has been named departmental geologist, producing department, for The Texas Co. He started with the company as a geologist in Shreveport in 1933, and in March 1949 was named assistant departmental geologist. He is a graduate of University of South Dakota.

Martin G. Kale, assistant district production foreman at Shidler, Okla., for Sinclair Oil & Gas Co., has been transferred to Lindsay, Okla., in the same capacity. Other changes in the production department include: **George R. Kelsey**, petroleum engineer at Oklahoma City, named senior petroleum engineer there; **Gibson S. Romberg**, gas analyst at Arp, Tex., named division petroleum engineer at Corpus Christi; **Farrell F. Thompson**, petroleum engineer at Pampa, Tex., named district foreman there; **John F. Butler**, gang pusher at Bairoil, Wyo., named assistant district foreman in that location; and **Mahlon F. Manville**, geologist at Baton Rouge, named petroleum engineer at Gainesville, Tex.

Dr. J. W. Bertetti, chief engineer of the El Dorado, Ark., refinery of Pan-Am Southern Corp., has been named technical director, and in his new position will have supervision of mechanical and chemical engineers and laboratory chemists and technicians. He has a B.S. degree in chemical engineering from University of Illinois, and M.S.E. and Ph.D. degrees in chemical engineering from University of Michigan. **Harry K. Wheeler** has been named assistant technical director of the El Dorado refinery and will assist Dr. Bertetti in supervision of technical personnel. Other changes include: **R. F. Provine**, transferred from the engineering department at the refinery to assistant area foreman of refinery operations; and **R. R. Gumaer**, technical assistant in the engineering department, named technical assistant to the general manager of the refinery.

DR. J. W. BERTETTI

Some of the members of Society of Automotive Engineers' fuels and lubricants activity committee are shown above during the recent national meeting of S.A.E. in Detroit. Left to right: William V. Hanley, assistant manager, Aviation Division, Standard Oil Co. of California, San Francisco; Dr. Alfred G. Cattaneo, Shell Development Co., Emeryville, Calif.; S.A.E. Vice President Arthur O. Willey, vice president, Lubrizol Corp., Cleveland, who heads the activity for 1950; A. L. Beall, Wright Aeronautical Corp., Wood-Ridge, N. J.; Hugh Hemmingway, Pure Oil Co., Chicago; Raymond I. Potter, chief, Fuels and Lubricants Service Division, Standard Oil Co. (Ohio); Dr. W. E. Kuhn, manager, Technology and Research Division, The Texas Co., New York; Dr. Charles L. Fleming, Jr., Standard Oil Development Co., Elizabeth, N. J.; W. E. Robbins, U. S. Naval Experimental Station, Annapolis; R. O. Campbell, British-American Oil Co., Toledo; Walter G. Ainsley, director, engineering laboratories, Sinclair Refining Co., East Chicago, Ind.; Jack E. Kline, Standard Oil Co. (Ind.), Chicago; and T. C. Smith, automotive engineer, American Telephone & Telegraph Co., New York.

Members of the Gulf Coast Section, American Institute of Mining and Metallurgical Engineers, are shown as they greeted Dr. L. E. Young, A.I.M.E. president from New York City, center, at the Houston airport. Left to right: Owen Thornton, The Texas Co., past section chairman; E. L. Petree, Gulf Oil Corp., Gulf Coast section chairman; Dr. Young; Tom Borland, Stanolind Oil & Gas Co.; and A. G. Gueymard, City National Bank, Houston. Dr. Young addressed A.I.M.E. members and guests at a banquet given in his honor at the Houston Club last week.

Glen Ford, geologist for The Texas Co. at Mount Pleasant, Mich., has been transferred to the Wichita, Kans., office as district geologist. Other changes at Mount Pleasant include: **Harry Bellows,** geologist, transferred to the Midland, Tex., office, and **Edward Roddy,** landman, transferred to Salem, Ill.

A. A. Stambaugh, since 1933 vice president in charge of sales and a director of Standard Oil Co. (Ohio), has been elected senior vice president of the company. An authority in the petroleum - marketing field, Stambaugh joined Sohio as director of industrial relations in 1928. A year later he was named sales manager and in 1933 was elected a director and vice president. He will continue in charge of all sales activities of the company.

Donald F. McMahon, Denver, has been named secretary of the Rocky Mountain Oil and Gas Association, succeeding **Carroll A. Lake,** who resigned.

F. W. Alcorn, Oil City, Pa., treasurer of the Pennzoil Co., has been named an assistant treasurer of the Pennsylvania Grade Crude Oil Association.

J. R. Cox, formerly of Shreveport, has joined Southland Oils, Inc., of Mississippi as superintendent of the company's Laurel refinery.

Frank D. Lortscher, Signal Oil & Gas Co., has been named manager of the firm's newly organized purchases and stores department. Widely known in oil - industry purchasing circles, Lortscher has been with Signal for more than 22 years, beginning company service in the Signal Hill field area. In his new position Lortscher will continue his operating headquarters at the main offices in Los Angeles.

Arthur F. Bosworth, Denver, has been elected a member of the board of directors of Northern Oklahoma Gas Co., succeeding his father, the late Arthur H. Bosworth.

Dr. Ben H. Parker, president of the Colorado School of Mines, Golden, has resigned and will rejoin Frontier Refining Co., where he served as vice president before going to the school in 1946. He will be succeeded at the college by **Dr. John W. Vanderbilt,** Denver geologist.

Dr. Robert W. Landes will soon take up new duties in Calgary, Alta., Canada, as assistant manager of exploration for Imperial Oil, Ltd., working under **Ray Walters,** manager. Landes is now en route from Peru, where he has been serving as divisional chief geologist at Negritos for International Petroleum, Ltd. He joined that firm in 1938.

Leo B. Agers, gas engineer for Magnolia Petroleum Co. at Cement, Okla., has been transferred to the company's Chitwood cycling plant in Grady County, Oklahoma, as plant engineer.

Jack Baumel has rejoined the Texas Railroad Commission's Oil and Gas Division as chief engineer, replacing **Clark Lloyd,** who resigned in September to become an independent consultant in Austin. Baumel formerly served as chief engineer of the division but was given a leave of absence to work for the Government of Venezuela. That government has requested that the commission extend Baumel's leave of absence so that he might continue his conservation studies in that country.

DEATHS

Kenneth A. Henderson, C. B. E., 45, treasurer and vice president of Imperial Oil, Ltd., died recently at Montebello, Que. A native of Acton, Ont., Henderson was executive chairman of the National War Finance Committee at Ottawa during World War II.

Orville G. Waring, 81, retired president of Bourne-Scrymser Co., lubricating-oil manufacturing company of Elizabeth, N. J., died January 10 in Plainfield, N. J.

Walter D. Caldwell, 70, Hempstead, Tex., oil man, died January 8 in Houston.

Richard E. Floyd, 59, independent oil man, Conroe, Tex., died January 6.

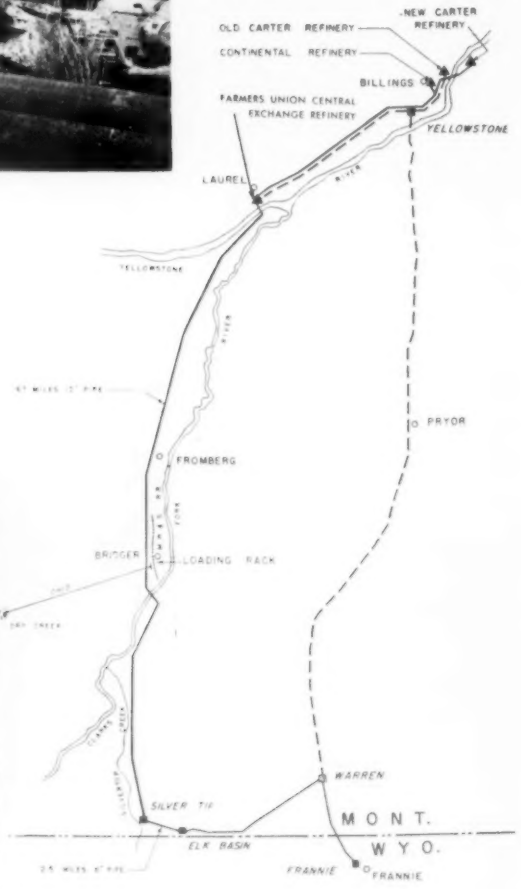
Dr. Michael Melamid, 67, chairman of the board of Raffinerie Belge de Petrole which operates a refinery at Antwerp, died January 10 in New York. A chemical engineer, he held several patents in the petroleum refining field and was also president of Melanol Corp., New York oil-marketing company.

Amos Rich, 74, a former land man for Gulf Oil Corp., died in San Antonio, Tex., January 9. Since his retirement from Gulf in 1942, Rich was engaged in oil-lease brokerage at Junction, Tex.

Lawrence Rozas, 34, employe of the Circle Drilling Co., and a resident of Durald, La., was killed in an automibile accident January 9.

Left: Laying 12-in. across irrigation ditch

Below: Map of Interstate Oil Pipe Line Co.'s Wyoming-Montana crude-oil pipe-line system. Dotted line indicates sections of line originally laid in 1944 by Yale Oil Pipelines, Inc., which have been withdrawn from service. Solid line shows the present system operated by Interstate consisting of the Elk Basin-Billings system built this year plus the former Yale section retained



Interstate Completes

Elk Basin Area Crude-Oil Pipe Line

by Paul Reed
Pipe-Line Editor

Section with coating protected by oak slats laid at river crossing

TO meet increasing requirements of new refineries at Billings and Laurel, Mont., Interstate Oil Pipe Line Co. has recently completed a new 67-mile, 12-in. crude-oil pipe line from the Elk Basin area.

Following downward as it does the courses of three streams, the new system takes full advantage of a 1,100-ft. drop in elevation making possible gravity flow at the rate of 50 to 75 per cent of rated capacity, depending on weather conditions. Pumping equipment at Silver Tip station is available for raising throughput to 40,000 bbl. daily. Eventually, throughput could be increased with additional pumping facilities to meet growing refinery requirements.

The whole new system laid along a water route, supplants a 51-mile, 8-in., Warren - Yellowstone section laid originally 5 years ago by Yale Oil Pipelines, Inc., on a different route over the mountains which called for considerable uphill pumping.

At Silver Tip, the Interstate line receives crude oil gathered by Ohio Oil Co. from the great Elk Basin producing area estimated to have reserves of 150,000,000 to 200,000,000 bbl. with producing life of more than 25 years. Deliveries are made to the new Carter Oil Co. 20,000-bbl. and Continental Oil Co. 7,500-bbl. refineries at Billings as well as to the Farmers Union Central Exchange, Inc., 10,000-bbl. refinery at Laurel.

Simplicity of design of the line and the unusual arrangements for traversing a 26-mile section across irrigated land are two distinctive features of the Interstate project. Laying of pipe across irrigated land was de-

Two 20,000-bbl. engine-driven pumping units at Silver Tip station

layed until September in order to avoid interference with growing and harvesting of crops. In the spring construction was carried on in the Northern Billings-Laurel section and in the semiarid area at the south end. Work was suspended in July and August.

Two-stage ditching was done in the irrigated land. In general the plan followed was to have the first ditcher remove soil while the second ditcher dug gravel. Soil was 1 ft. or less in depth through much of the irrigated ground. The ditchers were operated so that soil and gravel were piled in two separate backfills or spoil banks — one for gravel being nearest to the ditch. By doing this the gravel could be put in the ditch first during backfilling; then the soil was put on top.

Backfilling was all done by machines and mormon board operated from a boom tractor. No dozers were used in backfilling. Rocks, brush, twigs, and scrap metal were removed from the backfill and hauled off in a truck. Finally the backfill in the ditch was tamped and leveled. The line had 36 in. of cover in the farm sections comprising 70 per cent of the project and 24 in. of cover in the remaining dry land. The pipe was cushioned for the entire length of the project with 2 in. of dirt padding under the pipe and 6 in. over it.

Irrigation-water movements during construction were continuously maintained by temporarily installing 10 and 14-in. corrugated iron flumes in 8 and 10-ft. joints across lateral ditches encountered at intervals of approximately 50 ft. The main irrigation ditches were usually spanned by pipe going over the ditch. In a few cases it went under.

The pipe line was solid welded from end to end. There were no flanges at gate valves. One type of electrode was used for all beads. No. 85 Fleetweld—for the ½ and ⅝-in. wall pipe used throughout the land sections of the project. Electrode sizes were: 5/32-in., stringer; ¾-in. for filler and stripper beads; and 5/32-in. for the finish bead. Protection for the entire line was provided by application of coal-tar enamel, glass mat, and asbestos felt. The line was tested with 24-hour 100-psi. air tests and 1,000-psi. water tests. Water was evacuated by air before filling with oil.

The Yellowstone River was crossed by suspending the line with brackets placed under a highway bridge. At Rock Creek and Clark Fork River the line was buried 6 ft. deep in the stream beds. Laying of the line was contracted by C. B. Edmonds Transportation Co. which operated one spread for the job supervised by Roland Power and Grady Ross, former Interstate employes.

The principal pump station is the Silver Tip station with its 100,000-bbl. tankage, a short distance north of the Montana - Wyoming boundary equipped with two units to which a third will be added. Each consists of a 200-hp., 12-cylinder engine driving a 70-s.p.m. reciprocating pump of 20,000 bbl. daily capacity. In addition to receiving oil from the Ohio Oil Co. gathering system in Elk Basin, the Silver Tip station also receives from Interstate's Frannie station located just south of the Montana-Wyoming line.

Frannie station has two units, each with a 150-hp. engine driving a 7 by 12 reciprocating pump. These units replace three smaller units. Frannie station pumps through the Warren station which is no longer in opera-

(Continued on page 72)

Frannie station being revamped for new units

Left: Silver Tip station buildings. Right: Field-trip group visiting Wyoming-Montana system: O. R. Bates, H. S. Foote, George B. Randels, F. T. Pipkin, Interstate Oil Pipe Line Co.; Paul Reed, pipe-line editor, The Oil and Gas Journal; F. E. Miller and Robert Oleivine, Interstate

a study of LIMED MUD Systems

by William C. Goins, Jr.*

DURING the last several years the use of lime in drilling fluids has become increasingly popular until today "red limed muds," as these systems are frequently referred to, have become almost universally accepted for deep-drilling operations in the coastal areas of Louisiana and Texas. These are basically natural shale muds usually containing some added barytes and bentonite and to which an organic thinner, starch, caustic, and lime have been added as treating agents.

This type of mud system has several advantages over the fresh-water mud systems which it has largely supplanted. Among these are immunity to cement contamination, a greater toleration for dispersed shale before giving high viscosity, less gelation from salt-water intrusion, and the ability to successfully drill heaving-shale zones that would be difficult to drill with normal fresh-water muds.

The name red limed muds comes from the appearance of these muds when treated with quebracho, the most frequently used thinner. Other materials have been occasionally substituted for the quebracho; sulfonated calcium lignates have also been used and are available.

*Gulf Oil Corp., Houston. This paper is from the technical program of the 1949 production engineering conference, Gulf Oil Corp., Pittsburgh.

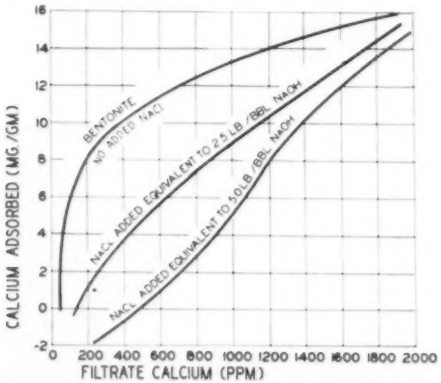
Drilling Practice

Normal fresh-water muds are usually changed or "converted" to a limed-mud system after the intermediate casing string is set and in preparation for deep drilling. This is usually around 6,000 ft. but varies from well to well. Usual procedure is to first raise the pH of the mud system to 11.5 or better with a caustic-quebracho mixture and then to run a pilot test to determine what quantities of caustic, lime, and quebracho are required to give a low workable viscosity and gel strength. It is often necessary to add considerable water to the mud before the lime can be added and yet maintain a low workable viscosity. The quantities of starch necessary to give the desired low fluid loss is also determined by pilot test and all these materials are added to the mud system during one or more circulations.

Quantities of chemicals required may vary considerably depending upon the type and quantity of mud solids and previous treatment, but usually are in the range of 1.0 to 2.5 lb. per barrel of caustic, 0.5 to 7.0 lb. per barrel of lime, and 0.5 to 2.0 lb. per barrel of quebracho or other thinner. Watering may be necessary to the extent of 25 per cent of the original mud volume and, depending on the fluid loss desired, 0 to 4.0 lb. per barrel of starch may be required. The end result is a relatively low-viscosity mud with low initial and 10-minute gel strengths and low fluid losses. Typical properties of a 12.5-lb. per gallon mud would be about as follows: pH, 13.0; viscosity (Marsh funnel), 50 seconds; thixotropy, initial, 0, 10-minutes, 3; fluid loss, 2.0 cc.; filter cake thickness, 1/32-in.

Results of Lime Addition

The usual explanation of the function of the lime is that it converts the sodium-base bentonite, clay, and shales to a more inert and less hydratable calcium base form. It is also said that as the lime is added during the "breakover" or conversion to a limed-mud system there is a period of high viscosity due to flocculation of the dispersed bentonite, clay, and shale, and that after sufficient lime has been added a low workable viscosity is attained. That


CALCIUM ADSORBED (MG./GM.)
BENTONITE NO ADDED NaCl
NaCl ADDED EQUIVALENT TO 2.5 LB./BBL. NaOH
NaCl ADDED EQUIVALENT TO 5.0 LB./BBL. NaOH
FILTRATE CALCIUM (PPM.)

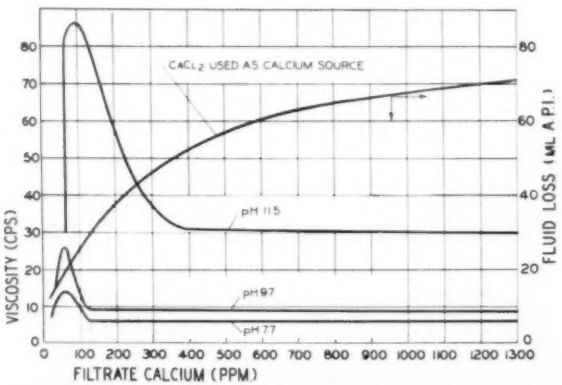


Fig. 1—(Left) Adsorption of calcium by bentonite, without and in the presence of sodium ions. Calcium chloride used as the calcium source. Fig. 2—(Right) Effect of calcium on fluid loss and viscosity of a 6 per cent bentonite suspension. Note the increased viscosity resulting from high pH

this explanation is insufficient is attested to by the necessity for watering the mud and adding large quantities of caustic before the lime addition can be made without giving a high final viscosity and gel strength. Laboratory tests also fail to show the breakover to be as described.

Another feature of the conversion to calcium-base muds is the low calcium ion concentration found in the filtrates of most field muds. While handbooks indicate a solubility for lime that would give 880 p.p.m. of calcium ion, the usual limed systems show only 60 to 200 p.p.m.

Realizing the practical necessity for caustic addition, most individuals treating limed muds make alkalinity determinations of one form or another. The most frequently used is the titration of the mud filtrate with acid to the phenolpthalein endpoint and the reporting of the equivalent sodium hydroxide on a percentage-by-weight basis. This is termed the per cent alkalinity and most mud engineers have some minimum alkalinity value which they believe must be exceeded before lime can be added to the mud without giving high viscosity. This varies from 0.25 to 0.70, depending on individual experience.

There is considerable evidence indicating that limed muds are less hydrated than water-clay muds. A number of these muds have been tested that had a total solids content of greater than 30 per cent by volume and yet had workable viscosities. One limed mud which contained no barite and weighed 10.5 lb. per gallon would run through a Marsh funnel faster than water. Normal fresh-water muds with solid contents such as these would be almost unpumpable. In some wells this feature has been used to reduce the amount of the barite requirements, the procedure being to allow the shale content of the mud to build during drilling so that the mud weight rises to the desired value without the usual barite additions. In normal fresh-water muds this would result in a higher than desired viscosity.

Limed muds are unaffected while drilling cement and it is interesting that cement has sometimes been used in place of lime as a treating agent. Salt and salt-water intrusion may gel up limed muds somewhat but this system shows a much greater toleration for salt contamination than does the usual fresh-water mud. Neither are limed muds completely unaffected by gypsum and anhydrite but they will tolerate limited amounts without undue gelation and a modification of the usual limed system gives a mud that may be used to drill thick sections of these contaminants.

Calcium Adsorption

One of the points of particular interest is the so-termed "conversion" of the sodium-base muds to the calcium-base form. This was investigated through a determination of the ability of clays and bentonite to adsorb calcium. One curve of Fig. 1 shows the adsorption of calcium by bentonite. As chloride ions are not adsorbed the quantity of calcium added was determined by calculating the equivalent of the chloride found and the calcium adsorbed was taken as the difference in the quantity calculated as added and the quantity found in the filtrate. Chlorides were determined by silver nitrate titration and the filtrate calcium was determined by soap-hardness method.

It is interesting to note that the extent of the calcium adsorption is dependent upon the filtrate calcium concentration. This is not inconsistent with the results obtained by other investigations[1,2] of the adsorption of ions from solution by clay. Both natural and artificial zeolites used in water softening give the same type of base exchange isotherms.

This would mean that lime additions to a mud do not result in a complete conversion of the colloidal material present to a calcium base as is often expressed, but rather that the amount of calcium adsorption depends upon the concentration of dissolved calcium. Considering the filtrate calcium values of 60 to 200 p.p.m. usually found in limed muds, this would indicate that the extent of the calcium adsorption is only a fraction of the total base exchange capacity.

Fig. 1 also shows the effect of the presence of quantities of sodium ion on calcium adsorption. Data were obtained through a repetition of the experiment described above with sodium chloride added to the bentonite suspension. Sodium hydroxide would have been used to make the test comparable to limed-mud practice but it was desired to avoid precipitation of the calcium as calcium hydroxide which would make the determination of adsorbed calcium impossible. These curves emphasize the weak affinity of bentonite and clays for calcium and show that the large amount of sodium hydroxide used in limed muds serves to further reduce the calcium adsorption.

Viscosity-filtrate calcium relationships are more complex and will be discussed later, but Fig. 2 shows that fluid-loss values of a mud are also dependent upon the filtrate calcium concentration. This illustration also shows the effect of calcium chloride on 6 per cent bentonite suspension. The viscosity maximum shown is associated with the treatment of a mud with a soluble calcium compound and would be evident in Fig. 4 if the caustic were omitted from that test. The stabilizing effect of the hydroxyl ion may be noted in the increased viscosity of the muds with the high pH.

The reason for the low filtrate calcium concentration usually found in limed muds becomes evident upon examination of Fig. 3 which is a plot of data[3] showing the variation in the solubility of calcium hydroxide with temperature and sodium hydroxide concentration. If 1.5 lb. per barrel of caustic is used in a limed mud with a circulating temperature of 122° F. (50° C.) it may be seen that the maximum solubility of the lime added is only 70 p.p.m. of calcium ion, whereas if the mud is at room temperature and no caustic added, the

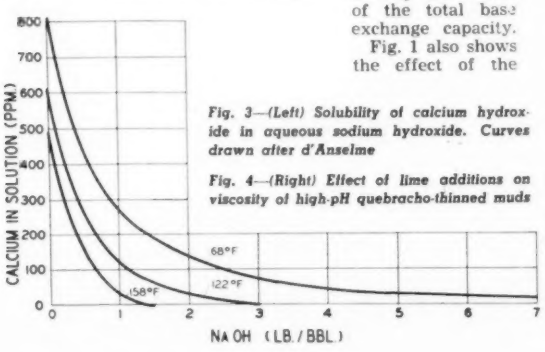


Fig. 3—(Left) Solubility of calcium hydroxide in aqueous sodium hydroxide. Curves drawn after d'Anselme

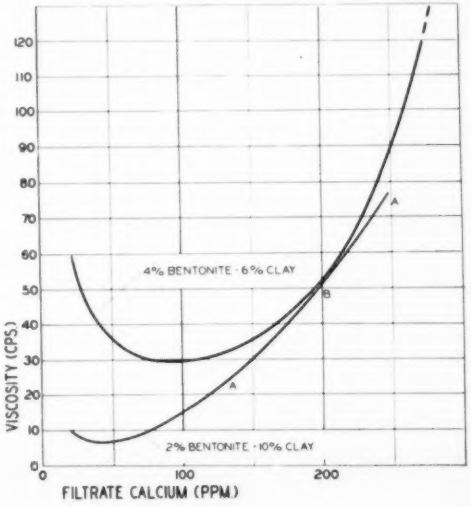


Fig. 4—(Right) Effect of lime additions on viscosity of high-pH quebracho-thinned muds

solubility of lime would be 840 p.p.m. of calcium ion. The presence of sodium chloride and calcium sulfate may somewhat increase the solubility of lime but the conclusion must be drawn that the caustic additions normally made to limed muds serve to limit the solubility of the added lime, and consequently, limits the extent of calcium adsorption.

Limed-Mud Viscosity

The viscosity relationships of limed mud systems are complicated by many factors, yet viscosity is a property which must be kept under control in drilling operations. Factors which affect viscosity are the kind and quantity of solids present, the stabilizing effect of the hydroxyl ion, the quantity of hydratable material present, the total per cent solids and the kind and quantity of thinner. Varying these factors can, of course, produce any viscosity from very thick to very thin.

Fig. 4 shows the results of a test designed to duplicate field breakover methods and to trace the viscosity changes that occur. The hydrated base mixtures consisted of 4 per cent bentonite and 6 per cent clay per 100 ml. water in one instance, and 2 per cent bentonite and 10 per cent clay in another. To these was added 50-50 caustic-and-quebracho mixture until the pH was raised to 11.5 and the mixtures were divided into a number of 500-ml. samples to which were added various quantities of lime. These were stirred 2 hours on the gang stirrer and tested.

It may be noted that these curves fail to show any breakover or maximum point in viscosity as is often described. Concentrations of lime as high as 7 lb. per barrel failed to give any appreciable increase in dissolved calcium about 250 p.p.m. showing the repressed solubility due to the caustic addition. The effect of increasing filtrate calcium was to cause a minimum in viscosity followed by a sharp increase that continued through the highest values of filtrate calcium developed. This area of minimum viscosity is in the filtrate calcium range of from 60 to 120 p.p.m. and is also the area of lowest gel strength.

This corresponds to the filtrate calcium values usually found in field limed muds and indicates that these concentrations are a natural result of field pilot tests made to determine the quantities of treating materials required for a low workable viscosity. To confirm this picture of the function of the caustic and dissolved calcium, samples from the test above were taken which had sufficient filtrate calcium to give a high viscosity. To these were added 0.5 lb. per barrel of caustic and the sample was restirred and tested. The filtrate calcium dropped and the viscosity dropped accordingly so that the new points were plotted on the curve in Fig. 4 as shown by the points marked "A" and "B."

It appears that in limed muds an excess of undissolved lime is normally carried and that caustic additions serve to limit the lime solubility and consequently calcium adsorption to values which give a minimum in viscosity and thixotropy. This explains the necessity for alkalinity and hydroxyl ion determinations commonly made in field handling of limed systems. The minimum values held to be necessary by field operators are a measure of the extent to which calcium solubility is repressed. If the calcium solubility is not controlled properly, watering is necessary to avoid a high viscosity. When there is sufficient caustic present to limit the solubility of the lime to the minimum viscosity range the addition of excess lime has little effect on viscosity and serves as a reserve to replace the calcium adsorbed by shales dispersing into the mud during drilling.

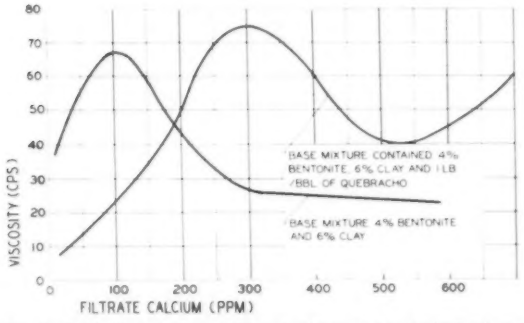
In a number of instances limed muds have been used without starch additions and yet gave fluid loss values of 10 to 14 ml. This is explained by the fact that the low-filtarte calcium allows insufficient calcium adsorption to cause any great flocculation of the colloidal material present.

There have been some limed muds to which little or no caustic was added. In others, salt and anhydrite contaminants have caused an increase in dissolved calcium above the values attained in Fig. 4. In these instances the viscosity-filtrate calcium relationships will vary considerably from the one just considered where appreciable quantities of caustic are used. However, it is believed that the picture of limed muds just presented will assist in the control of these systems.

Other viscosity-filtrate calcium relationships which are of interest are shown in Fig. 5. This shows the effect of lime additions to a quebracho-thinned, bentonite-clay mixture where the use of caustic is omitted. The test was made on a 4 per cent bentonite and 6 per cent clay mixture containing 1 lb. per barrel of quebracho. The calcium viscosity maximum is evident and the final rise in viscosity is apparently due to the stabilizing effect of the hydroxyl ion as there is a marked increase in pH with the increasing quantities of added lime.

Fig. 5 also shows the effect of calcium sulfate on this clay-bentonite suspension. Calcium sulfate has a solubility of 520 p.p.m. at 20° C. and can be used in treating a drilling fluid in much the manner in which lime is used. An added excess of calcium sulfate over that required for saturation leaves a reserve of undissolved calcium for reaction with shales drilled. Muds of this type are frequently used where massive anhydrite is drilled, the calcium sulfate source being the anhydrite. It is soluble enough to place the viscosity of the mud in the low range beyond the high viscosity zone shown. It is necessary to add some water to keep a workable viscosity while the mud passes through the gelling stage, and sodium carboxymethyl cellulose (C.M.C.) is used to maintain a low fluid loss.

(Continued on page 72)


VISCOSITY (CPS)
FILTRATE CALCIUM (PPM)
BASE MIXTURE CONTAINED 4% BENTONITE, 6% CLAY AND 1 LB /BBL OF QUEBRACHO
BASE MIXTURE 4% BENTONITE AND 6% CLAY

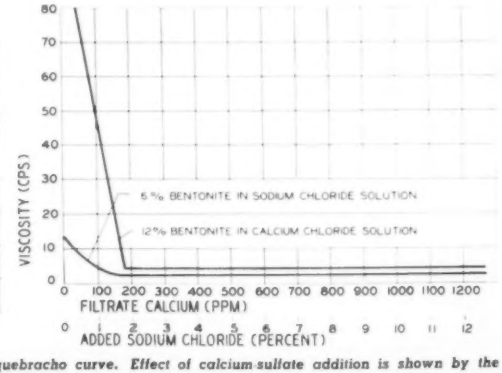

VISCOSITY (CPS)
6% BENTONITE IN SODIUM CHLORIDE SOLUTION
12% BENTONITE IN CALCIUM CHLORIDE SOLUTION
FILTRATE CALCIUM (PPM)
ADDED SODIUM CHLORIDE (PERCENT)

Fig. 5—(Left) Effect of lime addition is shown on the bentonite-clay-quebracho curve. Effect of calcium sulfate addition is shown by the bentonite-clay curve. Fig. 6—(Right) Effect of calcium and salt on viscosity of posthydrated bentonite solution—bentonite added after the calcium was in solution

Some Theoretical Aspects of CYCLING

by Dr. Morris Muskat

The Author

The author is director of Gulf Research & Development Co.'s physics division, Pittsburgh. He received B.A. and M.A. degrees at Ohio State University in 1926; was instructor of physics and chemistry at Bowling Green University in 1926-27; teaching fellow at California Institute of Technology in 1927-29, and received Ph.D. there in 1929. He joined Gulf as physicist in 1929, and has been head of physics division since 1935. He was chief of acoustics division, Naval Ordnance Laboratory, Washington, 1942-43. Dr. Muskat is the author of the well-known treatise, "The Flow of Homogeneous Fluids Through Porous Media," and the new "Physical Principles of Oil Production" (both published by McGraw-Hill Book Co., Inc., New York). This paper, to be published in two parts, with the second installment to appear in an early issue, originally was presented at the technical program, 1949 production engineering conference, Gulf Oil Corp., Pittsburgh.

WHILE the general physical and economic principles underlying the problem of cycling condensate reservoirs are quite well established and understood, there are a number of detailed features involved which have not been fully developed. These represent primarily matters of refinement on the gross procedures of condensate reservoir study, and must themselves be treated by approximate methods. Several such topics to be considered here are:

1. General features of cycling patterns.
2. The problem of permeability nonuniformity.
3. Retrograde condensation at well bores.
4. The differential depletion in condensate reservoirs associated with permeability stratification.

Cycling-Pattern Development

It is generally recognized that in order to achieve maximum recovery under cycling operations it is necessary to obtain a maximum areal pattern efficiency. Under idealized geometrical conditions pattern efficiency can be determined by calculation. In most practical systems, however, it is much more convenient to make such determinations by application of the potentiometric model. This makes possible not only the taking into account of irregularities in the gross geometry of the reservoir, but also the effect of changes in well-operating conditions during the cycling program. Such models basically refer to single identifiable geologic strata. If the composite reservoir formation is comprised of distinct layers, each of which is of individual significance and importance, and which constitute essentially separate reservoirs, model experiments should be conducted for each such zone separately.

Potentiometric models should be made to simulate the millidarcy-foot contour of the actual producing section. If the areal permeability distribution is not known precisely enough to warrant estimates of its lateral variation, the model should be made to simulate the isopach map of the reservoir. If the net hydrocarbon porosity is known to vary over the formation in such a way as would permit contour description, such variation should be taken into account in translating the measurements of the potentiometric model into the time advance of the dry gas-wet gas interface in proceeding from the injection to the producing wells.

In most actual situations, because of the low well density and the fact that pattern studies usually must be made after only one or two wells have been completed, it is quite impractical to estimate the permeability and porosity variations over the reservoir. Even taking into account the possible thickness variations may not be feasible, and it may be necessary to assume complete reservoir uniformity.

There is one general observation which will apply regardless of the geometry of the reservoir—the areal sweep efficiency will increase with increasing separation between the injection and producing wells, unless the latter are distributed in regular interlaced network. This implies that the injection and producing wells should preferably be segregated and located along opposite sides or ends of the reservoir. The reason is that the "dead" areas associated with the sweep of an injection fluid are largely the result of the local cusping of the injection fluid front about the producing wells.

If the injection wells are suitably located near the boundaries of the reservoir and are not separated too widely, the sweep of the wet gas about the injection wells will be quite complete regardless of the pattern of the producing wells as long as they are not too close to the injection wells. The dead areas about the producing wells will represent an approximately constant loss in the total displacement operation, its percentage of the whole decreasing as the gross area increases. This may be demonstrated by reference to the theoretical end to end sweep pattern indicated in Fig. 1.

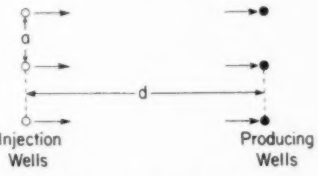


Fig. 1—Equations for sweep efficiency are based on the above end-to-end sweep pattern

It may be shown that in a uniform infinite sand the area left unswept at the time the injection fluid first enters the producing wells will be:

$$A = 2ad\,(1 - \text{ctnh}\ 2\pi d/a) + a^2/\pi \qquad (1)$$

If the separation between the injection and producing lines, d, is made greater than the spacing within the lines, a, the unswept area remains essentially constant. The sweep efficiency, therefore, is:

$$E = 1 - \frac{A}{2ad}$$

$$= \text{ctnh}\ \frac{2\pi d}{a} - \frac{a}{2\pi d} \qquad (2)$$

It will be seen that the efficiency, E, approaches one as the separation, d, is increased compared to a.

Similar high efficiencies can be achieved in the case of more symmetrical and circular productive areas. In such cases the ideal distribution-injection well at the center and producing wells located uniformly along the external boundary, or conversely—can be shown to have a sweep efficiency:*

$$E = \frac{n}{n+2} \qquad (3)$$

where

n = number of wells in the circular boundary.

Even for n = 8, or an angular separation of 22½° between the wells on the circular rim, the sweep efficiency will be 80 per cent. Increasing the number beyond 8 will give only minor increases in efficiency.

In general, one must apply the potentiometric model when the geometry of the reservoir or well distribution has any degree of complexity. Moreover, it is possible to take into account, when using the model, changes in the production or injection rates of the various wells, and the conversion of producing wells to injection duty when they suffer dry-gas breakthrough. In general, it should be possible to find well distributions and operating programs which will give 70-85 per cent sweep efficiency for uniform reservoirs.

Permeability Nonuniformity

More important than the choice of well distribution in determining effectiveness of cycling operations is the uniformity of the producing section. This is usually not subject to the control of the operator, and all that can be done is to determine the nature of the reservoir characteristics. Worse still, quantitative characterization of a reservoir with respect to its uniformity is extremely difficult, and treatment of nonuniform reservoirs cannot be carried out without making extreme simplifying assumptions. The only justification perhaps for attempting any quantitative analysis of nonuniform reservoirs is that such a treatment, if properly formulated, provides an upper limit to the possible effect of the reservoir inhomogeneities on the cycling performance. It is only from this point of view that the results to be presented here are to be evaluated.

The specific assumption which is necessary for quantitative evaluation of reservoir nonuniformity is that the composite producing section is comprised of a sequence of layers which differ from each other only in passing from layer to layer. This implies that fluid motion under steady state conditions will be parallel to the bedding planes without cross flow. This simplified situation will never be found in practice. Quantitative permeability correlations from well to well are never observed, and variation in permeability between wells may be as great as its variation with the depth in a well. In practice, fluids may be expected to move through the formation in irregular paths, through zones of least resistance or highest permeability. With this kind of flow may be associated a streamline system of the same general nature as would prevail in a uniform stratum, and with no cross flow between the actual streamline surfaces.

The different streamline surfaces automatically resolve the reservoir into continuous masses of rock of different average and effective permeabilities. The producing formation should, therefore, behave macroscopically as if it were simply stratified in parallel paths. However, there is no way of predicting the degree of equivalence between the actual streamline stratification and the assumed parallel stratification, nor is it possible to predict how the effective average permeabilities for the streamline stratified system will correlate with the individual permeabilities determined from cores.

Distribution Equations

If this idealized stratification is accepted the various layers may be rearranged in a continuously increasing or decreasing sequence of permeability, so that different types and classes of stratification may be characterized by numerical index parameters in analytical expressions for the permeability distributions. Three types of such functional representations, all of which are subject to analytical treatment, are the linear, exponential, and probability distribution. These may be described respectively by the equations:

$$k(z) = k_{min}\,[1 + (r - 1)\,z/H] \qquad (4)$$

$$k(z) = k_{min}\,r^{z/H} \qquad (5)$$

$$\frac{dz}{d\Psi} = \frac{H}{\sigma\,(2\pi)^{1/2}}\,e^{u} \qquad (6)$$

where

$u = -(\Psi^2/2\sigma^2)$, and

$\Psi = \log k/k_o$

In each of these equations, H is the total thickness of the producing section, z the depth along the well bore from the layer of lowest permeability, assuming that they have all been rearranged in sequence of increasing permeabilities, and k_{min} is the minimum value of the permeability. In Equation 4, r is the ratio of maximum to minimum permeability; its value completely fixes the linear permeability distribution. The same applies to the quantity, r, in Equation 5 and in both cases r will be referred to as the stratification constant.

For the probability distribution represented by Equation 6, k_o is the permeability of maximum probability, and σ is the standard deviation of the distribution. In principle, the probability distribution encompasses a range of permeabilities ranging from 0 to infinity. However, this aspect of the distribution is of little practical importance as the limits do not contribute appreciably to flow characteristics. It is more convenient for the probability distribution to use the "variation," V, as the stratification index rather than the standard deviation σ, where V is defined by:

$$V = 1 - e^{-\sigma} \qquad (7)$$

Since the detailed analysis of the cycling performance in these various types of stratified formations has been given elsewhere,* only the final results will be reproduced here. The two major aspects of these results are the total recoveries during the cycling phase to fixed abandonment limits vs. the stratification indexes; and the associated total gas throughput which would have to be injected or processed during the cycling phase. The criterion for the abandonment state has been chosen as the degree of dilution of the fluid stream by the dry gas which has broken through the higher-permeability zones, and is expressed specifically as the fractional wet-gas content of the produced gas, R_w. Curves have been calculated for three values of the latter, namely, 10, 15, and 25 per cent wet-gas content.

For the linear permeability distribution, recovery curves to abandonment vs. the stratification constant, r, are plotted in Fig. 2. The curve for $R_w = 1$ represents the recovery to first dry-gas breakthrough. It will be seen that the fractional wet-gas recovery to abandonment decreases with increasing degrees of stratification, but approaches asymptotic values. The latter may be shown to be given by $1 - (R_w^{1/2})/2$, so that the effect of stratification on the cycling recovery will have definite limiting magnitudes, and, as a whole, would not appear to be especially serious.

Corresponding magnitudes of the total gas throughflow, in units of reservoir pore volume, are plotted in Fig. 3. These, too, have limiting values as the stratification constant is increased, given by $(\frac{1}{2})\,(1/R_w^{1/2})$. These asymptotic features are characteristic of the linear distribution only.

For exponential permeability distributions the recovery vs. stratification-constant curves are shown in Fig. 4. Individual calculations were made for pattern efficiencies of 60, 75, and 90 per cent, and results are shown by the dot-dashed, solid, and dashed curves, respectively. Fractional recovery to fixed limits of wet-gas content in the flow stream, R_w, will continuously decrease as the stratification index increases, or as the for-

*This result has been derived by B. D. Lee (A.I.M.E. Trans., 174, 41 (1948).

*Cf. M. Muskat, A.I.M.E. Trans. 179, 313 (1949). Figs. 3-7 are also taken from this reference.

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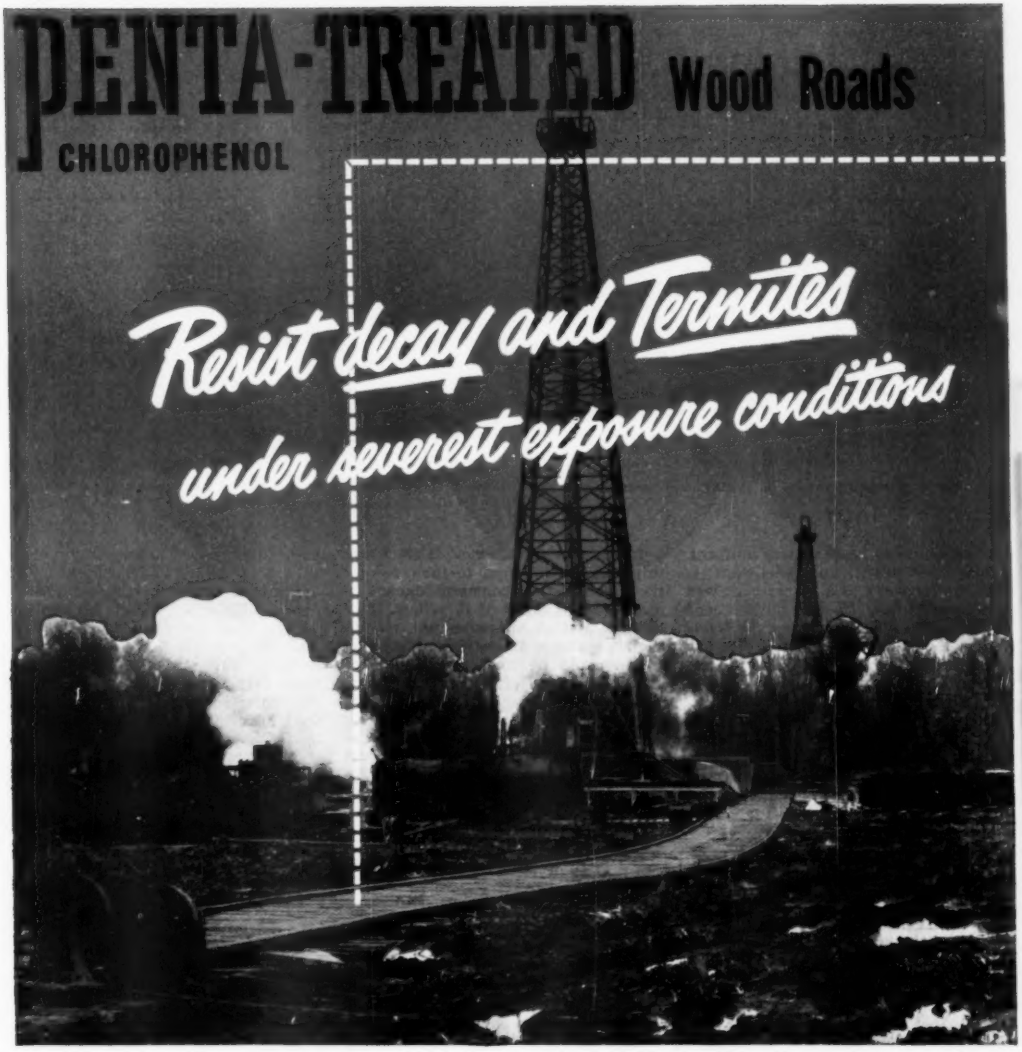

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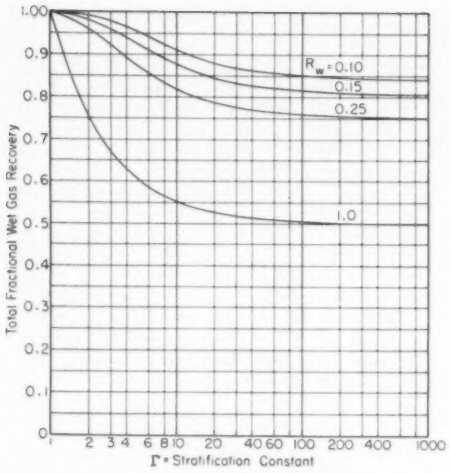


Fig. 2—Recovery curves vs. stratification constant

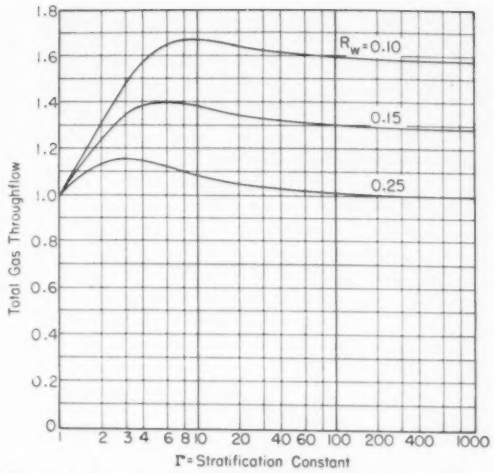


Fig. 3—Total gas flowthrough, fraction of reservoir pore volume vs. stratification constant

mation becomes less and less uniform. When the stratification constant is 100, the recovery to a 25 per cent wet gas content may be only 50 per cent of the initial wet-gas reservoir content, as compared to about 76 per cent for the equivalent linear distribution. Breakthrough recoveries, even for 90 per cent pattern efficiency, will be only 20 per cent for r = 100, as compared to 51 per cent for the similar linear distribution reservoir.

Even more significant is the implication of Fig. 4 that the value of the pattern sweep efficiency is of minor importance compared to the value of the stratification constant, except in ranges of the latter of 10 or less. This implies that except when the formation is uniform the effect of stratification could be more serious in reducing cycling efficiency than the choice of well distribution.

Throughflow curves corresponding to Fig. 4 are shown in Fig. 5, Q' denoting the total throughflow in units of the reservoir-gas content. As in the case of the linear distributions, these show maxima at intermediate values of the stratification constant, but in contrast to the former they also show continually decreasing throughflow values after the maxima are passed and the stratification constant is increased. For stratification constants exceeding 4 the effect of the well-pattern efficiency is so small that the curves for different values of pattern efficiency cannot be distinguished on the curves.

Corresponding results for probability distributions are plotted in Fig. 6,

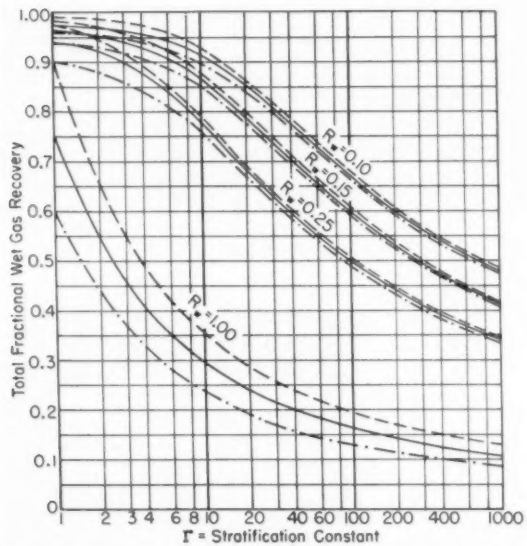


Fig. 4—Recovery vs. stratification constant for exponential permeability distribution. Pattern efficiencies of 60, 75, and 90 per cent are represented by dot-dashed, solid, and dashed curves respectively

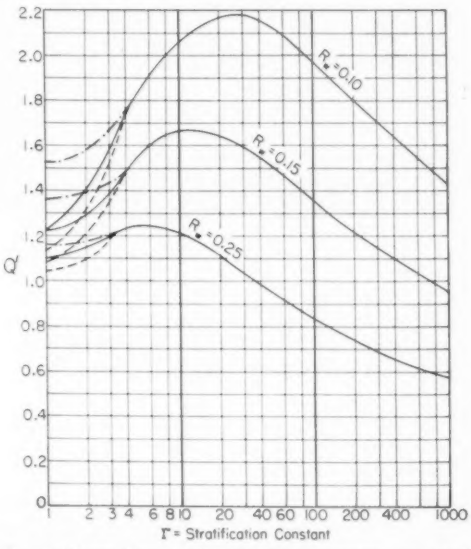
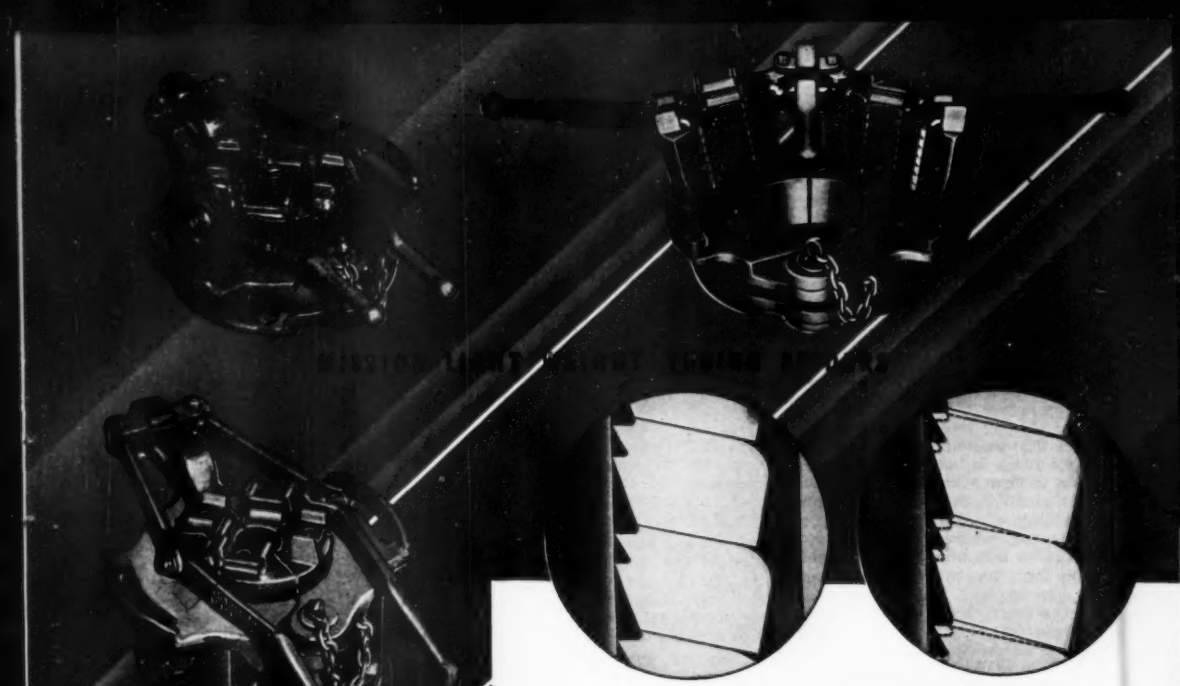


Fig. 5—Throughflow, fraction of reservoir content, vs. stratification constant. Pattern efficiencies greater than four have little effect on the throughflow curves, and are not differentiated as in Fig. 4



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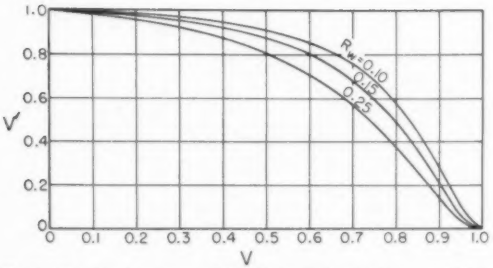


Fig. 6—Fractional recovery of initial reservoir content vs. variation of probability distribution

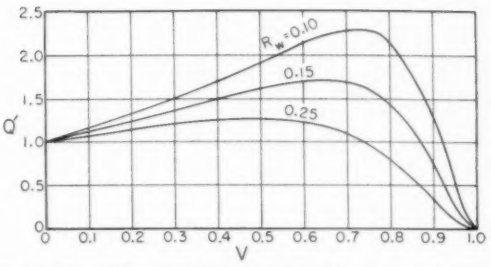


Fig. 7—Throughflow, fraction of reservoir volume, vs. probability distribution of permeability

where V' represents the fractional recovery of the initial reservoir content to the indicated abandonment values of R_w, and V is the "variation" of the probability distribution. Here, again, the cycling recovery decreases continually as nonuniformity of the reservoir increases, that is, as the value of V approaches 1. Up to variations of 0.4, however, the recoveries are of the order of 90 per cent or greater and are affected only slightly by the magnitude of R_w. Throughflows corresponding to Fig. 6 in the probability distribution systems are plotted in Fig. 7. These also show maxima at intermediate degrees of nonuniformity and vanish in extreme types of nonuniformity. In the case of the probability distribution pattern sweep efficiency has been assumed to be 100 per cent, as was also assumed for the linear distributions.

Application of these results will depend on the type of permeability distribution which most closely approximates the actual reservoir characteristics. This determination may be made by plotting in a sequence of increasing permeabilities the values as measured on the core specimens. An example of such a plot is shown in Fig. 8 as obtained from data on a well in a Gulf Coast field.* The ordinate indicates the sample number in the composite sequence, and it is assumed that each sample represents the same effective sand thickness.

The data do not fall on a single straight line as would be required by the strict exponential distribution. However, it is possible to break up the composite distributions into separate adjacent segments of linear form, so that one can treat the formations in question as the composites of two or more major segments in each of which the permeability distribution is approximately exponential. A system comprised of several major components in each of which the distribution is exponential can be treated by a superposition of the fundamental theoretical results for single reservoirs as shown in Figs. 4 and 5.

Aside from the assumption of ideal stratification which underlies all the theoretical results shown in Figs. 3-7, it has also been assumed that the net hydrocarbon porosity is the same regardless of the permeability. This, as well as the assumption of perfect stratification, would lead to conservative and minimum estimates of the unswept volume of the reservoir. Statistically the connate-water content of rocks of the same lithologic and textural character generally increases with decreasing permeability. Accordingly, the unswept strata in a composite but single lithologic formation, which would be largely confined to those of lower permeability, will initially contain lower hydrocarbon contents than would correspond to their absolute thickness. Failure completely to sweep these parts of the reservoir would not be as serious as would be implied by calculations where they had been given net hydrocarbon porosities equal to those in the most permeable strata.

*These have been made available to the author through the courtesy of W. H. Woods, Gulf Oil Corp., of Houston.

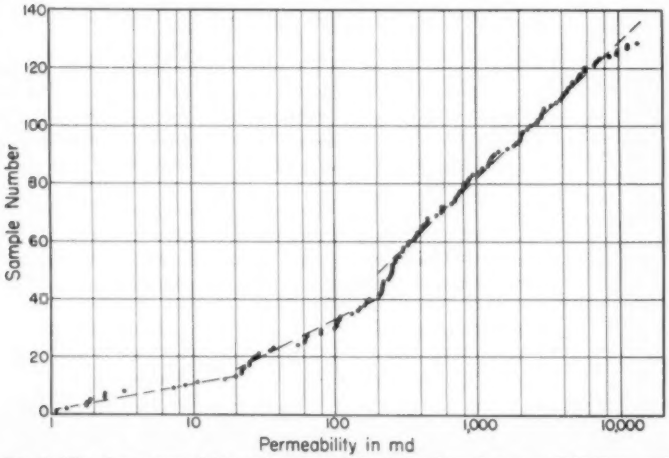


Fig. 8—Plot of sequence of increasing permeability taken from data on a Gulf Coast well

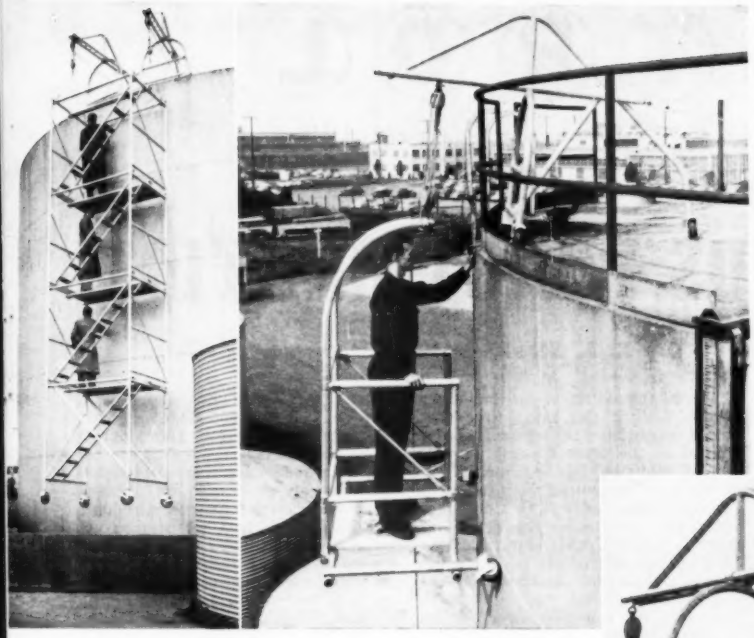
BOOKS

NATURAL-GAS ECONOMICS. By Joseph A. Kornfeld. Published by Transportation Press, Box 381, Dallas. 261 pp.

This volume, primarily intended as a reference book covering the major economic problems confronting the natural-gas industry of the nation, treats of the role of natural gas in energy sources, its place in the national economy, and modern concepts of conservation. The subject of synthetic fuels is discussed at length with a review of the history of the Fischer-Tropsch process, and some of the problems facing its application in the Southwest. Emphasis has been placed on the application of processes for the manufacture of basic industrial chemicals from natural gas as a raw material, and their respective manufacturing costs. The subjects of reserves, production, and demand are next developed in that sequence. Recent trends in pipe-line construction highlight the chapter on transportation preceding a brief discussion of the basic economic principles governing the selection of natural-gas pipe lines. Emphasis is placed on the subject of regulation with particular reference being given to the topics of supply and price. The author of this work is a reservoir engineer with Sohio Petroleum Co.

ENGINEERS DICTIONARY—SPANISH-ENGLISH AND ENGLISH-SPANISH. By Lolis A. Robb. Second Edition. Published by John Wiley & Sons, Inc., New York. 664 pp.

This second edition of the original work which appeared in 1943, has been considerably expanded, objectives being to cover electrical and mechanical engineering more thoroughly, and to bring all branches of civil engineering up to date. Moreover, terms peculiar in mining, shipbuilding, logging, sugar milling, and oil-field operations have been included. A new feature is the notation of gender with all Spanish nouns.



SUSPENDED SCAFFOLDING!—This new development is a far cry from many former types of fixed-position ground-mounted maintenance structures. Left above shows one of the new suspended scaffolds on a tank-farm job. Center photo shows a safety cage platform with rollaround. At right is detailed view of pair of rollarounds on top of large tank. Nicholson and Galloway, insulating contractors, saved $1,100 on first use of this equipment on applying insulation to tankage at Shell's new Sewaren plant ($2,400 was usual rental cost for temporary scaffolding; new type suspended scaffolding cost only $1,300; thus, besides the one-job savings, the new equipment is available for additional jobs without further cost)

Portable Refinery Scaffolding Speeds Maintenance Work

A VERY unusual development in scaffolding has received one of its first tests at the Shell Oil Co. plant at Sewaren, N. J.* The new design permits use of scaffolds in tension as well as in compression. In many cases installation economies can be achieved. Construction and maintenance work can be speeded.

The development of this equipment is by Up-Right Scaffolds. The units are built in Berkeley, Calif., and in Teterboro, N. J.

The scaffolding is made of heat-treated aluminum alloy. It permits use of multiple levels. These can be added to from the bottom, when the unit is to be hung, or from the top if the unit will be used in compression.

*For article describing this plant, see The Oil and Gas Journal, December 1, 1949, pages 70-71.

With the scaffolding in suspension, rollarounds allow lateral movement of the entire unit. As work progresses the scaffold is easily moved left or right to the new position. Vertical movement is obtained through block and tackle or hoists from which the scaffold is hung.

With the scaffold resting on the ground it may be built for one position, or, if it is to be used in more than one location, it can be equipped with caster wheels for ready moving.

One obvious place where scaffold in suspension can be used to advantage is in tank work. The rollaround shown in the photograph serves all types of fixed-roof tanks. The construction of the rollaround is such that it will clear all obstacles on the top of the tank such as hand rails, vents, etc.

In the case of floating-roof tanks a rolling hook is used. This provides the equivalent action of the rollaround.

A number of suspension positions are possible on the rollaround. These allow adjustment of the distance between scaffold and tank so as to avoid projections on the side of tank.

Each rollaround is attached by means of a wire rope and fittings to an eye bolt or other suitable projection in the center of the top of the tank. The two large casters of the rollaround serve as a fulcrum. These casters are nonswiveling. The swiveling caster at the other end of the unit merely serves to provide a tripod effect. This end of the unit raises up slightly off the surface of the tank as tension comes on the cable.

By adjusting the length of the cable the rollaround can be set to roll as close to the edge of the top of the tank as desired. As the unit rolls around the tank tension on the cable forces the wheels to roll in a curved path keeping the rollaround in a balanced position on its fulcrum with a tendency to tilt backwards a normal amount of 10°.

The equipment hung from a single rollaround or pair of rollarounds can consist of a series of scaffold sections locked together by an interlock, or it can be a safety cage. The safety cage is designed to replace the often hazardous bosun's chair.

The safety cage weighs only 70 lb. and is easily raised and lowered with a block and tackle. The casters swivel and roll on the wall of the tank and are attached to adjustable legs providing 24 in. of adjustment. These position the cage the desired distance from the tank. The adjustable legs are widely spaced to prevent the safety cage from being whirled around by the wind.

Railings are provided on three sides of the operator to insure his safety, and an eye bolt is provided on the upper rear rail for attachment to his safety belt. The arch support construction of the cage permits reaching to the sides without obstruction, thereby permitting the use of such time-saving equipment as pole guns vs. pistol-type spray guns.

CONTROL

Instrumentation for

LIGHT-ENDS FRACTIONATION

by E. L. Stark*

FRACTIONATION of hydrocarbons was introduced to the industry in early 1920 at which time the first stabilizer of any importance was developed and put in operation by Carbide & Carbon Chemical Co. In the early and middle twenties the cross-flow bubble-cap tray for absorbers, stills, and fractionating columns was introduced. Important design changes in automatic controllers occurred simultaneously with the improvement in design of fractionating equipment, notable of which was the first rate-of-flow controller utilizing the orifice meter for measurement of the fluid being controlled.

Constant research work by industry and educational institutions gave the design and process engineers more efficient tools to work with by imparting a more thorough knowledge of physical and thermodynamic properties of hydrocarbons. The development of high-pressure absorbers during the early part of 1930 was soon followed by high-pressure fractionation of hydrocarbons.

Rate-of-flow controllers and recording temperature controllers constituted the major portion of control systems during this period. The throttling of proportional band—sometimes referred to as sensitivity — was approximately 4 per cent of chart scale which meant that a small change in measurement produced large changes in control-valve position, oftentimes resulting in an oscillation of the control record. Furthermore, a change in any one of many process variables, constituting a load change, would cause some "drift" from the control point, or in other words, the controller would control at some other point within the 4 per cent proportional band. Fortunately, the proportional band limitation was 4 per cent, otherwise with a broader adjustment of this band, a further deviation from the control setting would be noticeable.

Recognizing the importance of a controller in which the proportional band could be increased so as to eliminate instability or an oscillatory record and at the same time that would maintain the variable under control at the control point, regardless of changing load conditions, led to the development of an instrument having automatic reset. Consistent with, and paralleling the design of other physical equipment for the fractionation of hydrocarbons, the design of a controller incorporating this important function did not occur overnight, but followed many months of research and mathematical work. Notable advancement in instrument design and improvements during the past 15 years is ascribable in a large measure to a high degree of concert between the natural-gasoline industry and instrument manufacturers.

Centralized Control Panel

The advent of the reset controller led to other major instrument developments and, finally, to the modern centralized control panel. The centralization of process instrumentation utilizing pneumatic remote transmission on all flow, temperature, and pressure applications, contrasted to three or four locally mounted controllers used for a complete control job two decades or so ago, presents a picture of a steady progressive movement in instrumentation.

An actual instrument installation and application is shown in Fig. 1, a schematic flow sheet of a four-column light - ends - fractionation plant. This drawing was prepared for the discussion of applied instrumentation and does not show actual dimensions of physical equipment such as reboilers, etc. This unit is Arkansas Fuel Oil Co.'s plant at Magnolia, Ark., in which there are four fractionating towers used for separation of the desired products (deethanizer, depropanizer, debutanizer, and butane splitter or deisobutanizer). Although, the process variables, which are feed, reflux, temperature, and pressure, are controlled by instruments suited for their particular applications, we shall, in our discussion, also refer to process irregularities that possibly would have occurred had there been a deficiency in instrumentation.

In order that hazardous fluids will not be brought into the control room and to permit installation of flow meters in the best relation to their orifices most recorders are operated by pneumatic transmitters. All the important controllers are located on a centralized control panel.

The raw gasoline is pumped to the depropanizer where propane and ethane are taken as overhead product and subsequently charged to the deethanizer where separation of those two products is made. Ethane is the overhead and propane the finished bottoms product in the deethanizer operation. The debutanizer charge is obtained from the base of the depropanizer column. Butane and isobutane are removed together as overhead product and subsequently separated in the butane splitter. The pentane-plus from the base of the debutanizer is the finished gasoline product.

Depropanizer

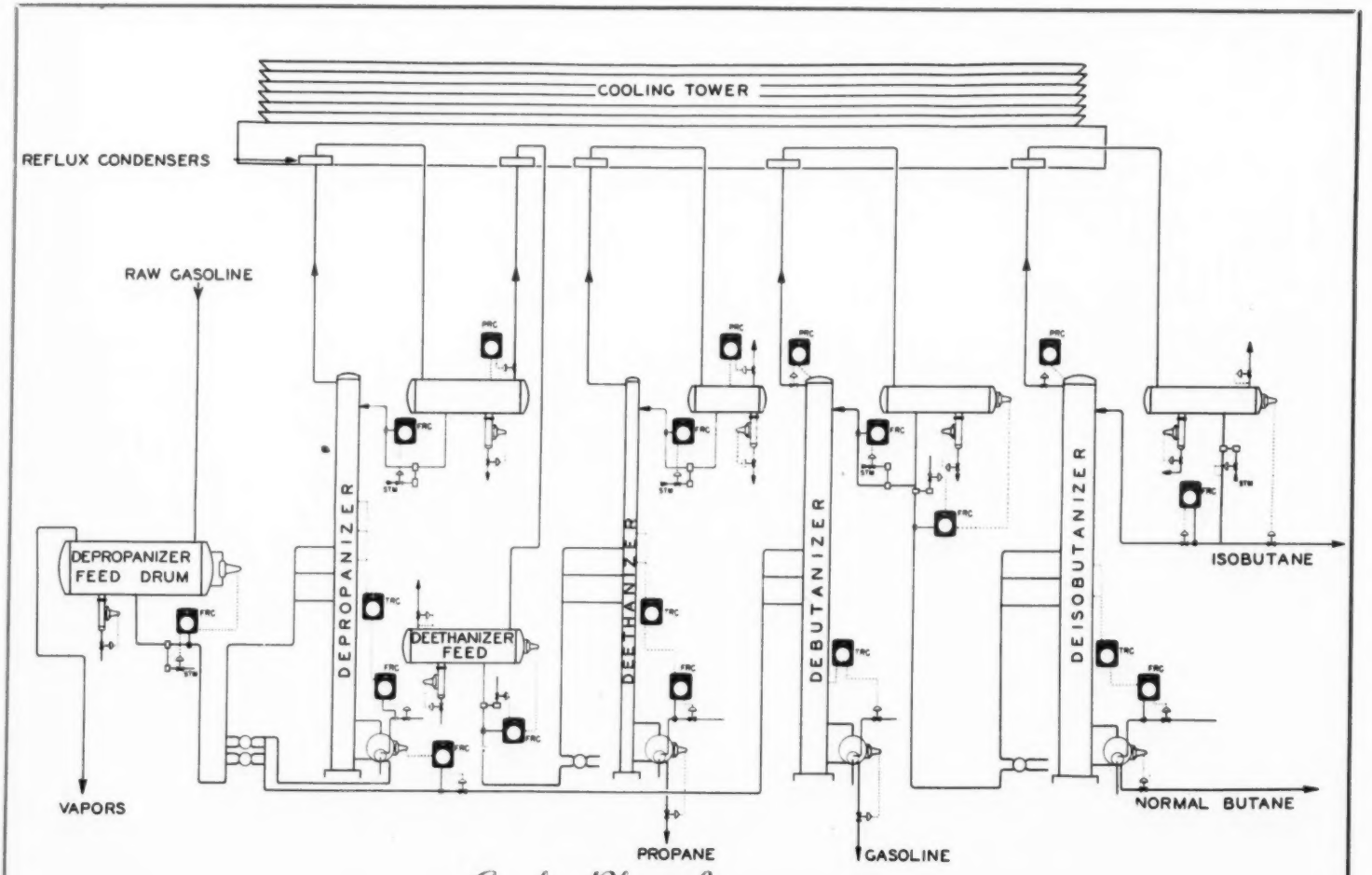
Emphasis is placed on the importance of efficiency in the operation

TABLE 1—OPERATING DATA ON COLUMBIA PLANT'S FRACTIONATING VESSELS

	Depropanizer	Deethanizer	Debutanizer	Deisobutanizer
Size	42″ by 85′	24″ by 47′	42″ by 87′3″	54″ by 142′3″
Number of trays	40	22	40	70
Pressure, psi.	330	525	115	135
Top temperature, degrees	136	120	152	147
Bottom temperature, degrees	280	182	250	178
Feed temperature, degrees	210	100	115	112
Feed tray, (number)	20	19	19	27
Feed tray temperature, degrees	208	150	180	170
Temperature control point, degrees	230	160	240	166
Temperature control point (number of tray)	14	15	2	35
Reflux ratio	1 : 1	1 : 1	1.5 : 1	13.5 : 1

Note—Trays are numbered from bottom to top.

*Foxboro Co., Dallas. Paper presented at N.G.A.A. regional meeting, Amarillo.



Gasoline-Plant Instrumentation

of the depropanizer column, the first in the series of four, because ideal or poor separation here is reflected in the operation of the other columns.

The raw-gasoline make tank is sufficiently large to absorb all irregularities of production. The charge to the depropanizer is controlled by means of an averaging type liquid-level controller pneumatically setting the control point of a flow controller with control valve located in the steam line to the charge pump.

This cascaded type of control system is necessary to insure that any feed rate required by the level controller is maintained irrespective of changes in pressure drop across the control valve. Should the operating pressure upstream or downstream from the orifice plate change, no matter how minutely, the differential pressure across the orifice will respond immediately, and since the function of the Stabilset flow controller is to maintain a constant differential, it immediately changes the air pressure to the control valve, thereby restoring the differential pressure across the plate to its original value. Obviously, had the installation included a level controller only, flow changes consequent upon changes in pressure conditions would not have been corrected until the level controller recognized the change in level and changed the air pressure to the controlled valve.

To a process engineer it is apparent that for efficient column operation, irregularities in feed rate cannot be tolerated. Because of the necessity of preheating the feed charge, particularly to the first column in a multicolumn series, a variable feed rate will materially affect the percentage of vaporization of the stock as it enters the column, a condition that is not conducive to good control. Should the rate change result in a lower percentage of vaporization, a heavier load is imposed on the stripping section — bottom part of fractionating column—with an ultimate requirement for more heat input through the reboiler. Conversely, a higher percentage of feed vaporization would result in easier stripping, but the fractionating part of the column — top section — would become more difficult. In either case it becomes necessary for the temperature controller, through reboiler heat input, to supply the heat deficiency, or remove the excess.

Temperature controller.—The temperature controller on the depropanizer column, as well as on any light-ends - fractionating column, must be of the automatic reset type. This function shall be explained later. Generally speaking, the automatic control of well-designed fractionating columns becomes a fairly easy job, provided all variables are controlled. Control is essentially that of supplying heat energy through the reboiler and the removal of that heat by reflux with a number of intermediate distillations evolving from each fractionating tray. Thermodynamics is further in evidence when we consider the operation and efficiency of each tray because the liquid is at its bubble point and, in order that progressive distillation might occur, it is necessary that latent heat be supplied. This heat is furnished from the ascending vapors. Simultaneously, latent heat is dissipated from the vapors in contact with liquid on the tray, resulting in a material exchange from vapor to liquid.

Although we do not have a temperature gradient curve to show, gradient temperature was determined and the bulb for the controller inserted in the column at a point where maximum temperature variations occurred. With temperature variations the controller changes heat input by operating a valve in the live steam line to the reboiler. The steam pressure to the control valve is maintained constant, otherwise it would have been necessary to install a Stabilset flow controller with orifice plate, operating so that with change in temperature the temperature controller would set the control point of the flow controller, thereby maintaining constant steam rate regardless of varying upstream pressure conditions. Should the operation not be done in this manner, a change in steam pressure upstream from the control valve would increase the flow of steam through the valve, with resultant increase in B.t.u. input and column temperature. Admittedly, the temperature controller would then reset the valve position to compensate for this increase in tower temperature, but with this type of control a process upset would have occurred.

Reflux controller.—The reflux rate to the depropanizer is controlled by a flow controller incorporating the automatic reset function. All the heat input through the reboiler must be removed by reflux and the amount of heat removed depends on the temperature of the reflux as it enters the column. Subcooling of the reflux does not as a general rule contribute to top tower efficiency for the reason that it cools the top tray, and possibly one or two below, so that these trays are used to raise the reflux up to its boiling point.

Columns are designed to operate with a given ratio of reflux to feed and in most instances, when tower capacities permit, the ratio of reflux is set at a figure above the minimum required. As stated previously, the feed rate to the plant (Fig. 1) is under automatic control, therefore, it is comparatively easy to set the control point of the reflux controller to maintain the desired ratio. On columns where the feed rate is variable, being controlled by a liquid-level controller from a preceding unit, improvement in reflux ratio could be made by having the level controller on the feed tank also rest the control point of the reflux-flow controller.

Pressure control.—By reference to Fig. 1 it will be observed that the depropanizer overhead is partially condensed for reflux with final total condensation subsequently. The column pressure control valve is located in the vapor line between the reflux accumulator and final condenser. For the moment we shall pass the importance of pressure control and instead emphasize this later under deisobutanizer control.

Deethanizer

The charge to the deethanizer is the overhead product from the depropanizer—propane and ethane—and the rate is controlled automatically by a liquid-level controller setting the control point of a flow-recorder controller. The temperature controller, having its bulb in the column, sets the control point of a flow controller which in turn controls the rate of exhaust steam to the reboiler. The bottom product is 98 per cent pure propane and the overhead is ethane.

Debutanizer

Feed charge to the debutanizer originates from the base of the depropanizer and flows to the former because of the difference in pressure in the two towers. The feed rate is controlled in the customary manner with a level controller setting the control point of a flow controller. The hydrocarbon mixture of the feed is butane and heavier. Butane is taken as overhead product, while the bottom product is gasoline to storage. A temperature controller with its bulb in the column operates a control valve in live-steam line to the reboiler. Reflux is controlled in the conventional manner, the reflux ratio being 1½ to 1 approximately. The back-pressure control valve is located in the vapor line between the tower and overhead condenser with overhead product totally condensed.

Deisobutanizer

The deisobutanizer feed originates from the debutanizer overhead condenser and is pumped under rate of flow control. The reflux-controller installation is conventional with ratio being approximately 13½ to 1.

Temperature control. — With practically pure butane as bottom product and with column pressure constant, additional heat input to the reboiler will not change the temperature of the product. Furthermore, because purity of product becomes greater at the approach of the bottom trays in the stripping section, producing very small gradient temperatures, the location of the sensitive elemenf of the temperature controller in this section of the tower would be of practically no benefit. Temperature-gradient curves should be analyzed

and the sensitive elements placed at point of maximum temperature gradient and composition change.

The temperature controller pneumatically sets the control point of a flow controller which in turn controls the rate of exhaust steam to the reboiler. Because of a very serious velocity distance lag and heat transfer lag it is extremely important that the temperature controller be of the automatic reset type and should also include the derivative function. The reset function of a well-designed controller produces a valve rate proportional to the measurement deviation from the control point and the amount of corrective action will therefore increase as the magnitude and duration of the deviation are increased. The function of the derivative is one which applies a correction which is proportional to the rate of change of measurement and is entirely unaffected by either the amount of deviation or the duration of deviation.

Because there are several trays between the temperature-controller bulb location and the reboiler, it follows that there is a large volumn of liquid to be heated to a new value, should there be a temperature deviation. Likewise the metal in the trays and tower store heat, consequently when heat is added through the reboiler a part of it is sacrificed to bring metal temperatures up to the temperature it had been prior to a decrease in product and tower temperature. Since hydrocarbon vapors passing up through the column are the carrying agent of the heat energy, the time necessary for an increase in heat energy to have its reaction at the tray where the bulb is located will be a function of vapor velocity and time required for material exchange on each tray. An instrument with automatic reset can be adjusted for this condition.

Heat-transfer lag through reboiler tubes is a serious one, where it is determined by the rate of heat transfer through the tubes, film coefficients, and magnitude of heat potential. The derivative function of the temperature controller corrects for this lag by making an immediate adjustment to the control valve, the magnitude of which is determined by the rate of change of temperature.

Pressure control.—Referring to Fig. 1 it will be noted that the control valve for the back-pressure controller is located in the vapor line between the tower and condenser. The back-pressure control valve on the debutanizer was likewise in the vapor line between the tower and condenser. The vapors from both towers are totally condensed and for that reason we believe these valve locations ideal for good pressure control. First, the volume of vapor through the valves is large, which is quite helpful and second, in bringing the unit on stream, pressure buildup is much faster.

There are many ways of controlling column back pressures—one of which is quite successful where overhead vapors are totally condensed is the control of rate removal from the accumulator tank so that the reflux condenser tubes are covered and uncovered a sufficient amount to maintain the required pressure.

We should like to emphasize the importance of an instrument having automatic reset when applied to back-pressure control. A proportional controller—so designated because the change in valve position is proportional to pen deviation—will not maintain pressure at the control point should the pressure change upstream or downstream from the control valve. Should a pressure change occur the amount of pen deviation (pressure) will depend on the magnitude of flow or reflux drum pressure change as well as the proportional band adjustment.

Consider a hypothetical case where the temperature at the thirty-fifth tray is being controlled at 166° F. and column pressure at 140 psi. The column pressure controller is of the proportional type without reset. Assume that with temperature and pressure at the stated values the overhead and bottom products are within specification.

The feed flow increases considerably for some reason or other. The immediate result is that a proportionate increase in flow (multiplied by the reflux ratio) will have to pass through the overhead pressure control valve. In other words, the valve must open some. The only way that the valve can open is for the pressure to increase and stay increased. Hence, the 140 psi. now becomes, say 142 psi. The temperature controller is still maintaining tray 35 at 166° F. and therefore with the higher pressure the mol per cent of butane on that tray will decrease and consequently the mol per cent of isobutane in the bottoms will increase (unless there are several excess trays in the tower) and valuable overhead product will be lost in the bottoms. The high operating efficiency of this plant is evidenced by the manufacture of 99.8 per cent plus isobutane overhead and the same percentage of purity for the butane or bottom product.

If the pressure controller is equipped with reset, then tower pressure will always remain at the desired value and changes in feed rate, temperature, or composition, in reflux temperature or ambient temperature will reflect as temperature changes at the thirty-fifth tray and will be corrected for by the temperature controller.

In controlling debutanizer-column pressure and butane-splitter pressure in this plant, a small portion of vapors are bypassed around the reflux condensers by means of throttling-type pressure-control units mounted on top of the valve, in order to hold necessary pressure on the reflux accumulators. This serves an added advantage in increasing the temperature of the reflux some, so that there will be no subcooling.

In the beginning of this paper it was mentioned that a high percentage of new plants, recently constructed, used centralized control panels with remote transmission of temperature, pressure and flow. A major contribution to the field of pneumatic transmission is the new differential pressure cell pneumatic transmitter for all flow applications. It is a flexible, readily calibrated mechanism operating on the highly accurate force balance principle. There is essentially no movement in its operating parts—no pressure-tight bearing or mercury. The total displacement in the instrument is approximately 2 cc. at maximum differential, therefore, it is not necessary to use condensate pots when measuring steam, or liquid seal pots when measuring other fluids. This reduces appreciably the total installation cost.

Although the temperature transmitters used in this plant utilize fully compensated liquid-filled thermal systems, the use of resistance-type electronic temperature measurement would obviate the use of the pneumatic transmission system. The resistance-type measuring system is recommended for temperatures below 500° F. because of a greater degree of accuracy as compared to a thermocouple. This measurement depends upon the change of resistance in a nickel coil with temperature and is an absolute measurement.

The thermocouple method measures the temperature difference between the thermocouple temperature and the reference or cold junction temperature. Since this reference junction temperature changes with ambient temperature, it is necessary to compensate for these changes; this is what is referred to as "cold junction compensation." Actually every connection in the measuring circuit acts as a cold junction, and, as could be expected, there are several. These are brought together and a compensating element mounted adjacent to them. Two problems thus arise—getting the compensating element to take the same temperatures as the junctions and calibrating the compensating element. The total of these errors is approximately ±2° F. and while the error may not be this great, the probability of error is this great. Should it be that this amounted to an absolute error so that it was always 2° F high, for example, it would not be too serious, but it is actually an instability, so that even though the instrument may be drawing a straight line the temperature may be varying ±2° F.

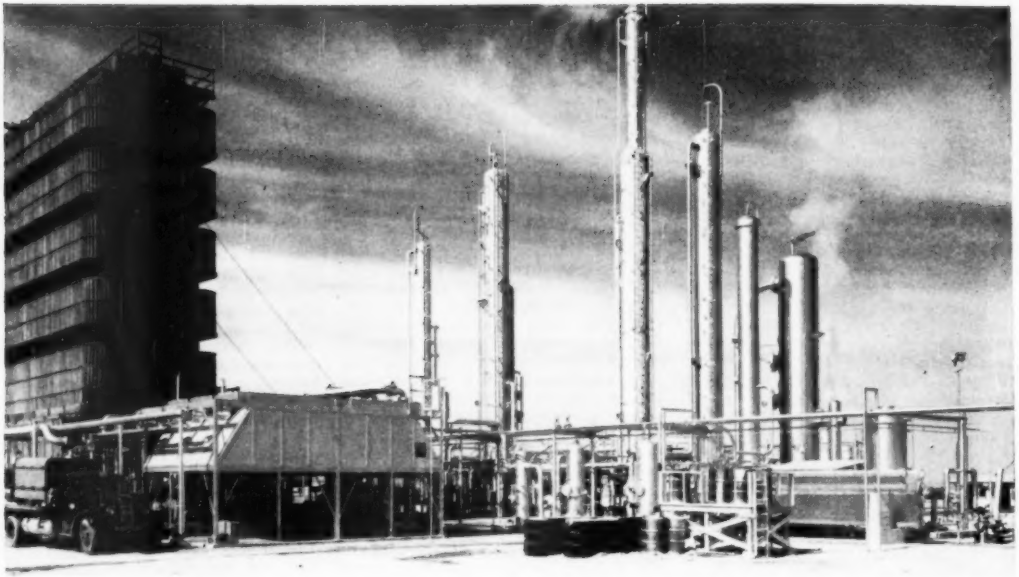


Fig. 1—The glycol dehydrating installation is shown in right foreground. The pan cooler on the left is part of the dehydrating installation

Joint Gas-Gathering System and Compressor Plant for Cymric Field

by F. H. Lacy, Jr., and Warren H. Kraft

SUPERIOR OIL CO., Standard Oil Co. of California, and Honolulu Oil Corp. during 1946 concluded an agreement to install a joint gas-gathering system and a compressor plant in Cymric oil field of California. The initial gas-gathering layout consisted of a 425-psi. high-pressure system and a 25-psi. low-pressure system. Compression of the low-pressure gas was carried on in two stages, with a final discharge pressure of 425 psi. At a later date an intermediate, or 125-psi., gathering system was installed. Honolulu Oil Corp. was designated as operator of the facilities, and the operating agreement provided that an absorption plant would be built when economics warranted the investment.

The high-pressure gas-gathering system was put in operation in June 1946 and the compressor plant and low-pressure gas-gathering system started handling gas in November 1946. Surplus gas above field fuel requirements was delivered to the gas-purchasing company after suppression of its dew point by cooling.

Application of a simple and extremely efficient process flow to the special problem of a rapidly declining plant load, and careful attention to equipment selection, costs and layout, made the installation of a "marginal" gasoline plant in Cymric field, California, an economically sound project. The authors are manager and engineer, respectively, of the gas and gasoline department, Honolulu Oil Corp., San Francisco. Paper presented at C.N.G.A. meeting.

During the latter part of 1947, as market conditions for L.P.G. and natural gasoline improved and better estimates of the future reserves and gas rates to be expected from Cymric field became available, a study indicated that a payout on an absorption plant was possible. Another, and probably the biggest, contributing factor was the increased richness of the gas insured by declining reservoir pressure and a consequent shift in the ratio of low-pressure to high-pressure gas. The problem then, as in so many cases, became one of designing and constructing an absorption plant as rapidly and economically as possible.

The approximate amount of capital that could be risked was agreed upon and as the cost of an absorption plant is recognized as being largely a function of the total oil-circulation rate, a study was made of a plant with limited oil circulation that would meet the following process requirements:

1. Handle an initial high gas rate of lean gas through the absorber.
2. Effect a maximum recovery of gasoline and liquefied petroleum gas when the gas load was reduced and the gas richness increased.
3. Use a minimum of fuel gas, cooling water, and electricity.

The basic study with its correlative analysis of various processing cycles proposed to meet the above plant requirements, consumed the remainder of 1947 and early part of 1948. In February 1948 a decision was reached to install a plant with the process cycle illustrated in the

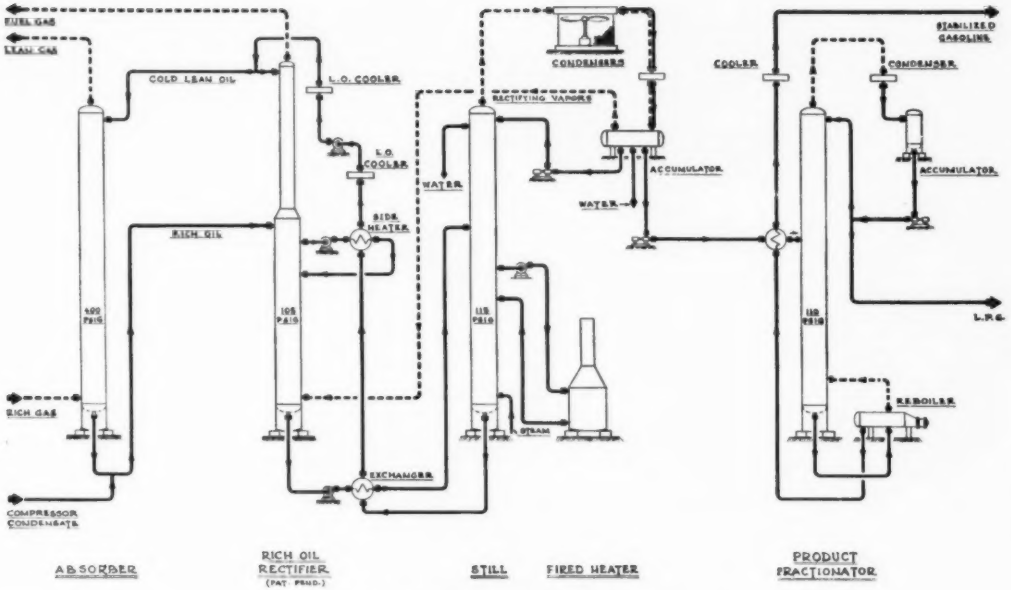


Fig. 2—Flow diagram of Cymric absorption cycle

accompanying flow sheet. Design calculations indicated that the plant would:

1. Handle an initial gas load of 35 to 40 million cubic feet per day of lean gas.

2. Effect a maximum recovery of butanes plus and a relatively high recovery of propane from 15 million cubic feet per day of rich gas.

3. Be capable of recovering 85 to 90 per cent of propanes from 15 million cubic feet per day of rich gas with only minor additions to the initially installed equipment.

4. Retain at least 90 per cent of the propane recovered at the main absorber under any and all conditions of plant operation.

5. Be able to produce either specification butane-propane mixture or propane as desired.

6. Meet the required economy on fuel, electricity, and water.

Ground was broken for the plant in May 1948 and product streams first run to storage on November 11, 1948.

General Plant Flow

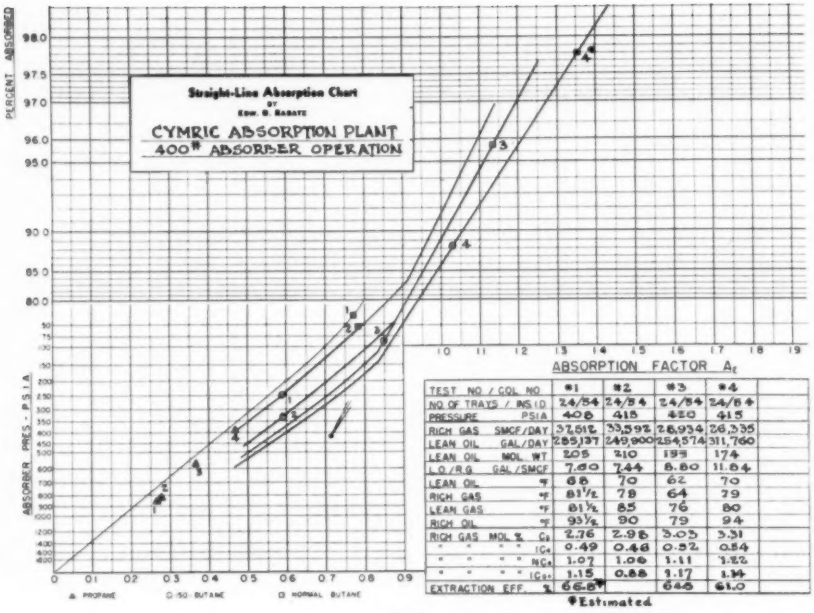
At the present time, due to declining field pressure, all gas is gathered at either 25 or 125 psi. The compressor plant handling this gas consists of five gas-engine-driven units totaling 2,960 hp. All jacket-water cooling is done by radiators. After cooling and scrubbing, the rich gas passes through a single main absorber, and from there to sales, field, fuel, etc. The rich oil from the main absorber is fed cold to a combination rich-oil rectifier and reabsorber. This unit is side heated by oil-to-oil interchange, and uses a vapor stream from the still reflux accumulator for rectification of the rich oil. The overhead vapors from this column are used for plant fuel.

From the bottom of the combination rectifier and reabsorber the rich oil passes through a second oil-to-oil heat exchanger on its way to a single high-pressure stripping still. Heat is applied to the still by a recirculation direct-fired side heater. Part of the still overhead is condensed as a deethanized liquid product—with the remaining vapors being returned to the combination rectifier and reabsorber for rectification service. The resultant deethanized liquid product is fed to a single conventional fractionator. This column operates totally condensing, with an overhead product of specification L.P.G. and a gasoline kettle product.

TABLE 1—MAIN ABSORBER OPERATION

Test No.—	1	2	3	4	†5
Pressure, psig.	393	400	405	400	400
Rich gas, S.M.c.f. per day	37,512	33,592	28,934	26,335	15,000
Lean gas, S.M.c.f. per day	35,800	32,000	27,149	24,210	13,000
Lean oil, gal. per day	285,137	249,900	254,574	311,760	310,000
Lean oil, mol. wt.	205	210	199	174	175
Lean oil, °A.P.I.	37.2	36.8	38.7	39.9	39.9
Lean oil-rich gas, gal. per S.M.c.f.	7.60	7.44	8.80	11.84	20.7
Lean-oil temperature, °F.	68	70	62	70	70
Rich-gas temperature, °F.	81½	79	64	79	80
Lean-gas temperature, °F.	81½	85	76	80	82
Rich-oil temperature, °F.	93½	90	79	94	96
Rich-gas comp., mol. per cent:					
H_2O	0.14	0.12	0.07		
CO_2	0.90	1.00	0.75	1.60	2.22
C_1	87.87	87.61	87.36	85.84	81.88
C_2	5.62	5.89	5.99	6.35	7.31
C_3	2.76	2.98	3.03	3.31	4.30
iC_4	0.49	0.46	0.52	0.54	0.75
nC_4	1.07	1.06	1.11	1.22	1.72
iC_5+	1.15	0.88	1.17	1.14	1.82
Total	100.00	100.00	100.00	100.00	100.00
Absorption, per cent:					
C_1	21.8	23.3	33.7	44.4	80.0
iC_4	55.4	48.3	71.1	88.1	99.0
nC_4	76.9	74.9	95.8	*97.8	99.0

*Estimated nC_4 absorption; test data showed 100 per cent. †Anticipated 15,000 M.c.f. per day operation without side cooling.



TEST NO / COL NO	#1	#2	#3	#4
NO OF TRAYS / INS I.D	24/84	24/84	24/84	24/84
PRESSURE PSIA	408	415	420	415
RICH GAS SMCF/DAY	32,512	33,592	28,934	26,335
LEAN OIL GAL/DAY	285,137	249,900	254,574	311,760
LEAN OIL MOL WT	205	210	198	174
L.O./R.G GAL/SMCF	7.80	7.44	8.80	11.84
LEAN OIL °F	68	70	62	70
RICH GAS °F	81½	78	64	79
LEAN GAS °F	81½	85	76	80
RICH OIL °F	93½	90	79	94
RICH GAS MOL % C_3	2.76	2.98	3.05	3.31
" " " " iC_4	0.49	0.48	0.52	0.84
" " " " nC_4	1.07	1.06	1.11	1.82
" " " " iC_5	1.15	0.88	1.17	1.14
EXTRACTION EFF. %	66.8*		64.6	61.0

*Estimated

Fig. 3

With this general plant flow in mind, we can consider some of the major units in greater detail.

Main Absorber

The main absorber is designed to operate at 425 psig. It is equipped with 24 perforated plates specially designed to maintain high absorption efficiencies over a wide range of loading. Original operating guarantees called for a total butanes recovery of 60 per cent at a 30,000 M.c.f. per day rich-gas rate when circulating 171 g.p.m. of 180-molecular-weight lean-oil at lean-oil and rich-gas temperatures of 80° F. Plant tests show this column exceeds its 30,000 M.c.f. per day efficiency guarantee by a substantial margin.

The column is equipped with a side drawoff tray which will be used for intercooling the absorber if and when it is desired to achieve propane recoveries of the order of 85-90 per cent at the storage tanks. To achieve these high propane recoveries, the only addition needed to present plant equipment is the installation of a side-circulation pump and associated gas and oil chilling units. Propane absorption recoveries of 93+ per cent at a 15,000 M.c.f. rich-gas rate are anticipated with present oil rates on chilling of the rich-oil and absorber side-circulation streams to 65° F.

Combination Rectifier and Reabsorber

The combination rectifier and reabsorber is designed to retain, under all conditions of absorber operation and intake-gas volume and composition, 90+ per cent of the propane content of the combined stream of rich-oil and compressor-plant condensate while so deethanizing this stream that the resultant fractionator feed contains not over 2½ per cent of ethane in its propane and lighter fraction. Design oil circulation to the reabsorber was 35 g.p.m. at a plant intake rate of 30,000 M.c.f. per day rich-gas—or 20 per cent of the main-absorber oil circulation. In actual operation, this per cent of reabsorber oil holds the ethane content of the propane and lighter fraction of the fractionator feed to between 1.5 and 2.0 per cent with propane retention of 90+ per cent.

Side heating of the rectifier is used in combination with the recirculation of rectifying vapors between the still-product accumulator and the rectifier base. This avoids both the high final lean-oil temperatures associated with the conventional base-heated rectifier cycle and the employment of expensive secondary heat-exchange circuits for heat conservation.

The rich oil from the absorber enters this unit cold at the top of the rectifying section. A recirculating side-stream is withdrawn from an intermediate rectifier tray and pumped through a side-heating interchanger on the hot stripped lean-oil stream. Rectifying vapors from the still accumulator are fed to the base of the unit. Control of the side-heater temperature is maintained by a temperature-actuated bypass valve on the hot lean-oil at the still-feed preheating interchanger, while the volume of rectifying vapors is controlled by controlling the temperature in the still reflux accumulator.

By proper mutual adjustment of the rectifier temperature and rectifying vapor volume, it is possible automatically to control the ethane-propane ratio in the fractionator feed within close limits for wide and relatively rapid changes in intake-gas composition and volume such as experienced at certain times of the year at Cymric between a hot afternoon's operation and the following cold early morning's operation.

As in the main absorber, specially designed perforated plate trays are utilized in the combination rich-oil rectifier and reabsorber to attain high efficiencies over wide ranges of column loading.

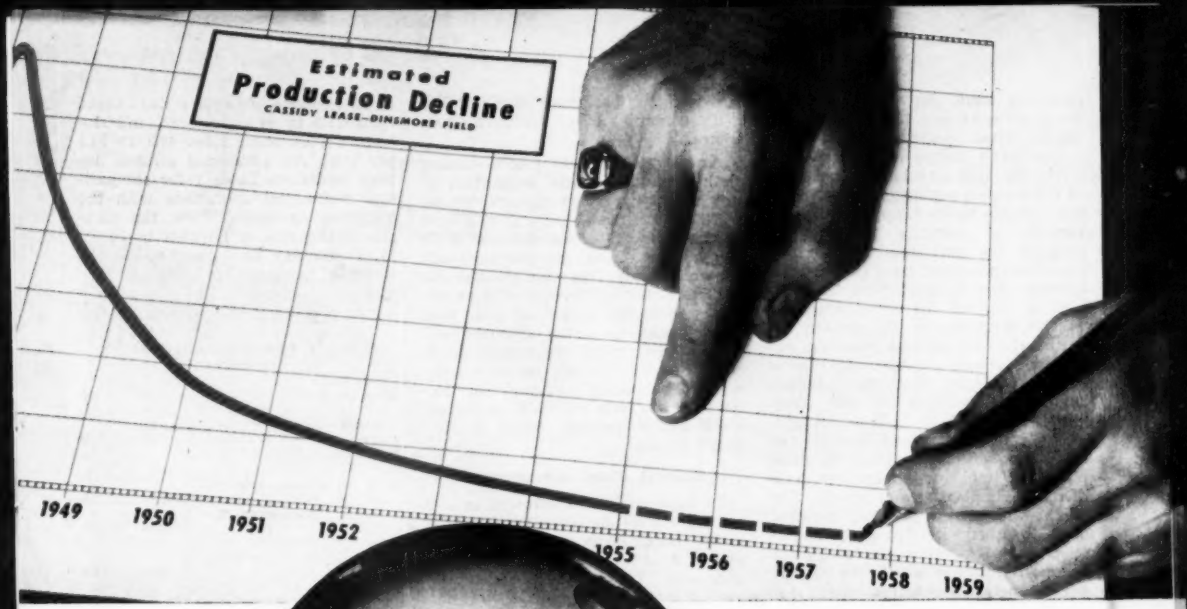
High-Pressure Still

Because of the need to return rectifying vapors from the stripping still accumulator back to the rich-oil rectifier, the stripping still at Cymric is operated at approximately 115 psig. This vessel uses four separate tray designs. Exchanger preheated feed is introduced in the middle of the column. The partially stripped oil is withdrawn at a point several trays below the feed tray, pumped through the fired heater, and returned to the column. Stripping steam, side water drawoffs, and cold reflux are employed in the conventional manner. Lean oil from the bottom flows under still pressure back through the still-feed heat exchanger, rectifier side heater, and first-stage water coolers—after which it is picked up by the lean-oil circulating pump, forced through a final water cooler, and returned to the absorbers.

In order to hold capital expenditure to a minimum, only one product fractionator was installed. This column is of conventional design with accessories adequate to produce either a butane-propane L.P.G. or commercial propane as an overhead product, and natural gasoline as a kettle product.

Pumps

Lean-oil and cooling-water circulation duties constitute the main



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pumping loads for the plant, and these services are handled by gas-engine-driven centrifugal pumps.

The three pumps required respectively for side circulation of rich-oil at the rich-oil rectifier, feeding rectifier bottoms to the stripping still, and recycle of partially stripped oil through the still fired heater, are operated in tandem by a single steam turbine. The exhaust from this turbine is utilized for reboiler service at the fractionator. By proper adjustment of its exhaust pressure, this turbine's steam consumption can be closely balanced with the reboiler-steam requirements of the fractionator.

The fractionator feed service, and the reflux services for both the stripping still and fractionator, are handled by simplex steam pumps. The exhaust from these reciprocating units, together with that of the boiler-feed pump, supplies the stripping-steam requirements of the still—which operation simultaneously disposes of the lubricating-oil contamination of the exhaust steam from these reciprocating units.

All water condensate from the stripping-still drawoffs and product-fractionator reboiler is collected and returned to the boiler-feed system. Available raw water is of bad quality, scarce, and expensive—hence the high degree of steam recovery thus achieved is of real monetary value at Cymric.

Cooling System

An aerial cooler employing two separate engine-driven fans is utilized for removing the high-temperature heat from the still overhead—with the lower temperature heat from this stream, together with that of the lean-oil and product fractionator streams being removed at a conventional atmospheric-type cooling tower. This cooling-system arrangement effects an appreciable saving in expensive water consumption, and eliminates any high-temperature stream being cooled in the cooling tower.

A steel-plate water basin was installed on an elevated grade for the cooling tower for a further saving in over-all cooling-system cost.

Cooling-tower water is treated with sulfuric acid for pH control, a commercial algicide (Moberg) for algae control, and with chromates (Orocol) to control corrosion.

Boiler Plant

The plant is provided with three second-hand 104-hp., 250-lb. oil-field-type firebox boilers. This boiler capacity is considerably in excess of that needed for the plant operation. In fact, one boiler can carry the plant load at well under normal rating, and one boiler constant fired as standby. The cost of the installed boiler plant was less than that of new equipment for the design load, thus providing a maximum of flexibility with a minimum of boiler maintenance.

An elevated atmospheric skimming tank is used for final separation of any light hydrocarbon contaminate of the reclaimed stripping-still and fractionator water condensate—with the streams from the stripping-still drawoffs traversing coal-packed coagulators ahead of the skimming tank. Water from this skimming tank, plus treated makeup water, is introduced into a conventional atmospheric feed-water heater through which a very small "balancing" surplus of exhaust steam from the plant is routed.

All boiler makeup water is Permutit treated.

General Plant Arrangement

To keep capital investment as low as possible, serious attention was paid to the design of an equipment layout which would be "compact, but not congested." This was achieved by the use of overhead pipeways, location of the tandem-operated pumps adjacent to and between the respective columns which they served, use of three control boards located on a common operating aisle adjacent their respective units, and placement of interchangers and pumps on both sides of this common operating aisle, rather than using a single-sided operating front. Finally, while fire-hazard requirements made it necessary to locate the fired heater and boilers some little distance from the operating plant area, the water treaters, feed-water heater, and boiler feed-water pumps were located considerably closer to the main processing area.

Operator protection from the weather, the housing for an operator's desk and storage of operating and instrument records, are provided for by a small control house fronting on the main operating aisle and centrally located thereto. This house has three sides of glass which allows the operator to observe the main equipment while seated at his desk.

Product Storage and Disposal

Forty-two thousand gallons of storage are provided for L.P.G. and 38,000 gal. for natural gasoline. A truck loading rack with both L.P.G. and gasoline loading facilities is provided, as well as facilities for shipping gasoline by pipe line.

Operation

Two complete tests have been run on the Cymric plant, and two other tests on the absorption section only. Pertinent absorber data from these tests are shown in Table 1. These tests cover a variation in gas load from some 37,500 M.c.f. per day to 26,300 M.c.f. per day, with a corresponding variation in oil-gas ratio from some 7.60 to 11.84 gal. per M.c.f. Propane absorption has ranged from 21.8 to 44.4 per cent, and isobutane absorption from 48.3 to 88.1 per cent. An additional column has been added to Table 1 for comparison of the test operations with the expected operation when the rich-gas intake rate is reduced to 15,000 M.c.f. per day and the propane absorption increased to some 80 per cent.

Fig. 3 presents the results of the

TABLE 2—RECTIFIER-REABSORBER OPERATION

Test No.—	3	4
Pressure, psig.	105	105
Discharge gas, S.M.c.f. per day	815	920
Discharge gas, °F.		78
Lean oil to main absorber, gal. per day	254,574	311,760
Lean oil to reabsorber, gal. per day	52,840	54,288
Lean oil to reabsorber, per cent of lean oil to main absorber	20.7	17.2
Compressor condensate, gal. per day	*1,850	3,190
Compressor condensate, liquid per cent:		
C_1	0.14	0.18
C_2	0.75	0.51
C_3	3.00	1.63
iC_4	1.86	1.39
nC_4	6.46	3.59
iC_5+	87.79	92.70
Rich oil to rectifier, °F.	79	94
Rich oil to side heater, °F.	107	118
Rich oil from rectifier bottom, °F.	175	173
Recycle vapor, S.M.c.f. per day	2,065	2,520
Recycle vapor, °F.	135	132
Propane in rectifier feed retained in liquid product, per cent	91.1	89.8
Ethane in propane and lighter fraction of liquid product, per cent	1.42	2.06
Lean oil from exchangers to coolers, °F.	124	133
Plant production:		
Gasoline, gal. per day	20,283	18,695
Gasoline, R.v.p.	24.6	20.3
L.P.G., gal. per day	15,470	18,625
L.P.G., R.v.p.	128	118
Total liquid product, gal. per day	35,753	37,320

*Calculated from plant balance.

TABLE 3—ABSORPTION PLANT FUEL AND STEAM CONSUMPTION

Fuel gas—	Test 3	Test 4
Oil heater, S.M.c.f. per day	224	320
Boilers, S.M.c.f. per day	208	177
Gas engines, S.M.c.f. per day	35	37
Total S.M.c.f. per day	467	534
Per cent of rich-gas rate	1.61	2.03
Net heating value, B.t.u. per cu. ft.	1,140	1,146
Steam—		
Process steam, lb. per hr.	4,320	5,000
Gasoline shipping pump, lb. per hr.	450	450
Total boiler load, lb. per hr.	4,770	5,450

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four plant tests in a straight-line chart plot. The steepness of the respective operating lines and their small differences in slope (representing an "extraction efficiency" spread of only 5 per cent in 61-66 per cent) indicate excellent absorption performance for a wide range of loading. In fact, these particular tests represent the highest 400-500-lb. absorber efficiencies of which we have any record.

Performance of the rectifier-reabsorber unit determined from the plant tests is shown in Table 2. High propane retentions, coupled with essentially complete deethanization while at the same time maintaining a low temperature on the lean oil to the coolers, is the interesting feature of this table. Incidentally the "17.2 per cent" of lean oil over the reabsorber on the second test was a little too low to effect a full 90 per cent recovery of propane.

The stripping still operates with a heater-outlet temperature of approximately 550° F. Plant lean oil is maintained at 180-185 molecular weight, with a 340° F. Engler initial and a 30-40 mm. water vapor pressure. Average gasoline end point is 285° F., with an average 90 per cent of 225° F. Stripping steam used per gallon of lean oil amounts to 0.14 lb. Less steam could be used and has been used in the past. However, since all steam used is exhaust steam, and since the water condensate from the steam is recovered and returned to the boilers, no effort has been made to reduce the still steam consumption to a minimum.

The exceptionally low consumption of fuel by the units incorporated in this plant is aptly illustrated in Table 3. The total water circulated at the atmospheric water cooling tower averages 1,300 g.p.m. Electric energy is purchased for the plant lighting and to drive the L.P.G. and standby shipping pumps only.

The Cymric plant was engineered and constructed by J. B. Gill Co. and E. G. Ragatz, associate, with the process design being furnished by E. G. Ragatz and the detailed engineering and construction performed by J. B. Gill Co. Patent applications are applied for by Ragatz on the rich-oil rectifier cycle employed.

Limed Mud Systems

(Continued from page 54)

Only small amounts of caustic are added with the thinner and if starch is used instead of C.M.C. it will ferment. This has proved to be the most economical mud for drilling the massive anhydrite of East Texas. The limed muds previously described tolerate some calcium sulfate but tests show that appreciable quantities increase the dissolved calcium with a consequent increase in viscosity.

One of the most important considerations in limed muds is the effect of the dissolved calcium in inhibiting hydration. This particular feature is the reason usually given for the success of these systems. If hydration is inhibited there is less tendency for shales to heave, fewer viscosity difficulties from shales drilled and dispersing into the mud, and any clays present in the producing zones will not swell and reduce permeability.

Fig. 6 illustrates the effect of calcium ions on the hydration of bentonite as measured by viscosity development. This test is distinguished from those illustrated previously in that the calcium was in solution before the bentonite was added. It is a posthydration test, whereas in the previous tests the bentonite and clays were prehydrated.

The test is comparable to the effect of a calcium-bearing filtrate on the hydration of colloidal materials drilled and it can be seen in the figure that 175 to 200 p.p.m. of dissolved calcium gives a maximum inhibiting effect on hydration. While it was previously shown that the filtrates of limed muds usually contain somewhat less than this, the curve indicates that the quantities of dissolved calcium common are effective in limiting hydration to a lesser degree. There is also shown in Fig. 6 the effect of salt on hydration of bentonite and it appears that 2 per cent sodium chloride also gives a maximum inhibiting effect on hydration.

These results indicate that a mud carrying 2 per cent salt and/or more than 200 p.p.m. of filtrate calcium offers definite advantages over normal muds. Salt contaminations of 2 per cent or greater frequently occur as a result of salt contamination during the drilling operation. Filtrate calcium concentrations of 200 p.p.m. or greater occur during anhydrite drilling and are occasionaly found in limed muds. However, reference to Fig. 4 shows that a filtrate calcium concentration of this amount is difficult to achieve without the development of a high viscosity. The use of lesser quantities of caustic, greater quantities of thinner, earlier additions of lime while the well is shallow and the solids content is low, all offer possibilities for allowing increased quantities of filtrate calcium and the advantage of an increased effect in inhibiting hydration.

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Acknowledgment

The guidance of Walter F. Rogers of Houston Chemical Laboratory, Gulf Oil Corp., in the preparation of this paper and in the experimental work discussed herein is gratefully acknowledged.

Elk Basin Pipe Line

(Continued from page 51)

tion. Warren station was originally built for the Yale system.

With the exception of 200 to 300 bbl. daily production of sweet Silver Tip 42° A.P.I. gravity oil, all of the oil handled by the system is sour crude with a high hydrogen sulfide content which requires special safety precautions for men going to the tanks. Sour crudes handled are Byron and Frannie 26°, heavy Elk Basin 28°, and light Elk Basin 39°-40° A.P.I. gravity.

Shipments are handled in three distinct mixtures specified by the three refineries. Mixing is done in tanks at Silver Tip. These tanks are coated inside at the vapor space. Batched shipments of these crude-oil mixtures are handled by a procedure similar to that of products lines.

At the refinery delivery points, back-pressure valves are being installed to facilitate more efficient operations. By the closing of a valve at either refinery the stream can be switched for delivery to either of the other refineries.

To make clear the relationship between the old and the new systems, an explanation is perhaps needed.

The original system completed by Yale Oil Pipe Lines, Inc., in August 1944, from Elk Basin to Billings and Laurel consisted of 81 miles of 6 and 8-in. pipe following a fairly direct mountainous route from Frannie to Yellowstone near Billings. This was operated by Yale until Interstate ran it under a management contract from December 21, 1944, until its purchase by Interstate which became effective January 1, 1946. Operation of the 51-mile, 8-in. section between Warren and Yellowstone has been discontinued and the pipe will be disposed of.

Interstate's new system announced early in 1949 consists of 67 miles of 12-in. from Silver Tip station via Bridger, Laurel and Yellowstone to Billings. Between Elk Basin and Silver Tip there is 2½ miles of 6-in. which connects with a 12-mile, 6-in. line from Elk Basin to Warren, originally laid by Yale which is being continued in service by Interstate. An 8-in. line has recently been laid by Interstate from Carter's old plant to its new one at Billings.

An important contribution to the economic success of Interstate's construction of this project has been the attention given to public relations in dealing with land owners particularly in the irrigated area where much care was required to insure that the right-of-way would be in good condition on completion of the undertaking.

Information for this article was procured through the cooperation of the management of Interstate Oil Pipe Line Co. during the author's trip to visit the system.

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PROGRESS in METALS

by W. L. Nelson
Consulting Engineer

Alloy for Offshore Drilling, Other Marine Applications

FOR the past decade or so, thousands of metals and alloys have been given sea-water corrosion tests at Kure Beach, N. C. The most outstanding test results so far have been from Hastelloy alloy C. The action of sea water had practically no effect on this alloy. For 10 years, specimens of alloy C remained in the test and at the end of this time all but the most severely tested specimens still had their original surface finish. The others showed only a very small weight loss.

International Nickel Co. started this project in 1935 and specimens of Hastelloy A, B, and C were introduced in January 1939. Since 1939 the tests have been extended to include thousands of other metals and alloys. Specimens are exposed both on the beach and in the water.

Beach specimens are mounted on racks about 250 yd. from the ocean shoreline where they are continuously exposed to the action of sun, rain, and salt-water spray. In order to minimize galvanic decomposition, the samples are held in place with porcelain insulators.

Submerged specimens are continuously immersed at a depth of 3 to 4 ft. in water that is flowing at a velocity of from 1 to 2 ft. per second. Here, specimens are not only subjected to the corrosive action of salt water, but also to erosion from tidal sand and the action of various types of marine organisms. They are inspected periodically after being scraped free of marine growth, electrolytically cleaned with dilute sulfuric acid, and scrubbed.

Test results.—Eleven Hastelloy alloy C samples were exposed for 10 years on the beach racks. After the 10 years' exposure, none of these specimens showed any measureable weight loss or pitting. The highly reflective surface retained by the three cast, ground, and polished specimens after 10 years' exposure can be seen in Fig. 1.

Results of the submerged tests, as shown in Table 1, were also very promising. Hastelloy alloys A and B and the type of stainless steel tested do not have salt-water corrosion resistance that is comparable to alloy C.

The C alloy was also tested under conditions simulating service in condensers that use sea water as a coolant. Tubular specimens of the alloy were fastened to a rotating disk by insulating plastic bushings. Rotation of the disk forced the specimens through the water (86° F.) at a speed of about 20 ft. per second, causing considerable aeration. For comparison, the rate of corrosion on a 70:30 copper-nickel alloy is also given. (See Table 2.)

A nickel-base alloy.—Hastelloy alloy C is one of a series of nickel-base alloys, designated A, B, C, and D, which are produced by Haynes Stellite Co., Kokomo, Ind. It has high strength (125,000-135,000 psi. tensile strength and 52,000-58,000 psi. yield strength) and can be fabricated into almost any type of process equipment. (See Table 3 for composition.) Alloy D, a nickel-silicon alloy, was not tested at Kure Beach.

Marine applications.—Obviously, alloy C is one of the most resistant materials available. Uninterrupted operation is often vital and hence the alloy is useful for metering devices, regulating valves, heat exchangers, pumps, filter screens, electrical contacts and certain piping. In offshore drilling, certain sections of casing might be constructed of Hastelloy C. This alloy is probably one of the best materials available for marine services and hence it might be used for offshore drilling equipment where large stocks of replacement parts cannot be readily available.

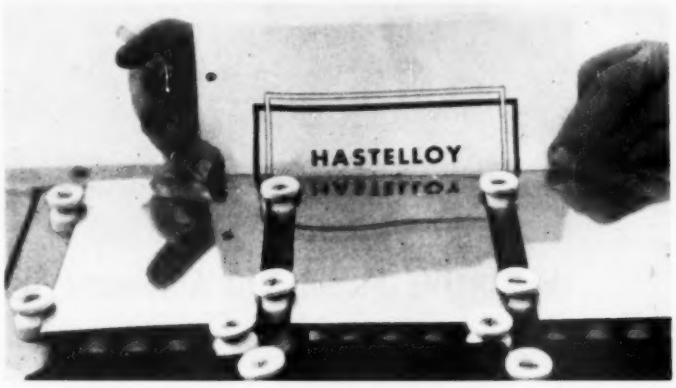


Fig. 1—After 10 years on the beach, these three Hastelloy alloy C samples have their original polished finish

TABLE 2—WEIGHT LOSS IN GRAMS

	First 20 days			Total 60 days		
	Spec. 1	Spec. 2	Average	Spec. 1	Spec. 2	Average
Hastelloy C	.0187	.0118	.0149	.0455	.0512	.0484
70:30 Cu-Ni, high Fe	.18	.19	.19	.33	.34	.34
Hastelloy C	.0003	.0002	.0002	.0002	.0003	.0002
70:30 Cu-Ni, high Fe	.0028	.0030	.0029	.0017	.0018	.0018

TABLE 3—COMPOSITION OF ALLOYS TESTED

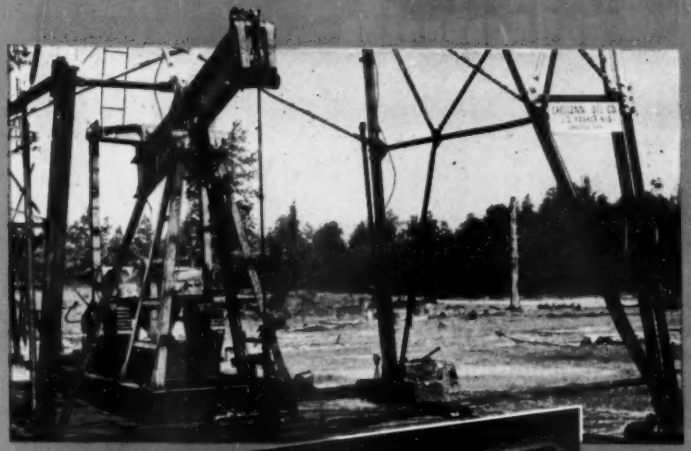
Hastelloy alloys†	Cr	C	Si	Mn	Mo	Fe†
A	*1	*0.12	*1	*1	*3	18-20
B	*1	*0.12	*1	*1	26-30	4-7
C‡	15.5-17.5	*0.15	*1	*1	16-18	4.5-7

*Maximum. ‡Tungsten 3.75-4.75. †Main element is nickel.

TABLE 1—SUBMERGED TEST RESULTS

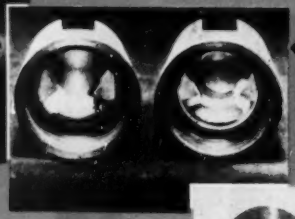
Alloy—	Surface preparation	Size (in.)	Time of test, days	Weight loss, grams	Weight loss, M.d.d.	Avg. pitting
Hastelloy A	Cast and ground	¼ x 6 x 12	2,406	394	17.8	0.027 in. max
Hastelloy A	Rolled and sandblasted	¼ x 6 x 12	2,406	327	17.6	0.027 in. max
Hastelloy B	Cast and ground	¼ x 6 x 12	2,406	306	13.7	0.033 in. max
Hastelloy B	Rolled and sandblasted	¼ x 6 x 12	2,406	172	9.3	0.033 in. max
18-8 stainless steel	No. 8 finish	⅛ x 12 x 12	685	31		0.130 in. max
18-8 stainless steel	No. 6 finish	⅛ x 12 x 12	685	42		perforated
18-8 stainless steel	No. 4 finish	⅛ x 12 x 12	685	35		perforated
Hastelloy C	Cast and ground	¼ x 6 x 12	3,500	9	0.5	none
Hastelloy C	Rolled and sandblasted	½ x 6 x 10	3,500	5	0.3	none

The "Story" of Neilsen Pump No. 4886 . . .

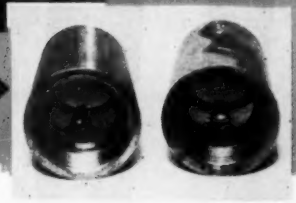


520 days of service with only 2 pullings and $30.15 worth of replacement parts, in an Arkansas well where pumps were formerly pulled on an average of every 4 days!

Plunger at top taken from pump, compared with new plunger below.



Top cage (right) taken from pump, shows effects of wear, compared with new cage (left).



Note ball wear on guides and metal erosion at openings while seat-ring contact remains intact on bottom cage (right) taken from pump.

SEVERE salt-water corrosion and floating sand conditions make wells in the Crain Sand in the Urbana, Arkansas field real production problems—as every operator knows who has one.

On January 23, 1948 Creslenn Oil Company ran an "Oilwell"—Neilsen 2½" x 2¼" x 7' I-R Metal Sectional Liner Barrel Tubing Pump, complete with 48" minus .001 I-R Metal Composite Plunger equipped with Stainless Steel Top Cage and Stainless Steel Closed Cage on the bottom of the plunger, in their J. C. Parker No. 5 well at a depth of 2,954 feet.

On June 21, 1948, sucker rods in the well were replaced with "Oilwell" Grade "L" Rods. The pump was inspected at the same time and one 2¼" Neiloy Ball and Seat and one Bottom Retainer (total cost $10.90) were replaced. (Note effect the following month* in the production chart.)

Again on December 26, 1948, the pump was removed and inspected. This time the bottom cage and one adapter were replaced at a total cost of $19.25.

On June 26, 1949, after 520 days, the pump was pulled and replaced. Upon "miking" the plunger it was found that the top of the plunger showed minus .016", it was minus .007" at 12", minus .007" at 24", minus .009" at 36" and minus .012" at 48". Measurements of the sectional liner barrel show that wear had increased the original bore from a minimum of .002" to a maximum of .008"—the latter being approximately 24" from the top end.

But the production chart tells the real operating story of Neilsen I-R Metal Pumps.

Date of Fluid Test	Strokes Per Min.	Length of Stroke	Total Barrels per Day
February 23, 1948	28	54"	838
March 20, 1948	28	54"	824
April 22, 1948	28½	54"	844
May 22, 1948	28	54"	832
June 21, 1948	28	54"	771
*July 22, 1948	28	54"	861
August 23, 1948	28	54"	844
September 21, 1948	29½	54"	936
October 24, 1948	28½	54"	904
November 21, 1948	28	54"	815
December 22, 1948	28	54"	769
January 22, 1949	28	54"	793
February 20, 1949	28	54"	783
March 21, 1949	28	54"	770
April 23, 1949	28	54"	742
May 21, 1949	28	54"	725
June 20, 1949	28	54"	703

It will pay YOU to get the facts on "Oilwell" and Neilsen Subsurface Pumps—whether or not yours are "problem wells."

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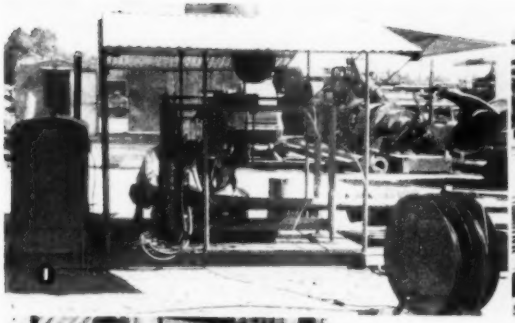
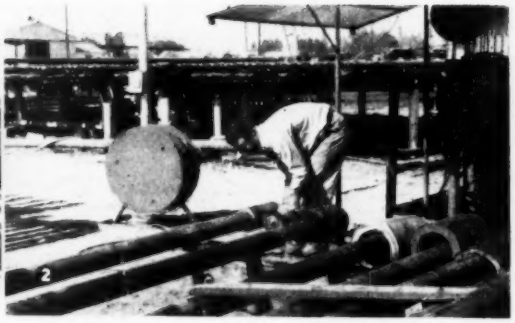
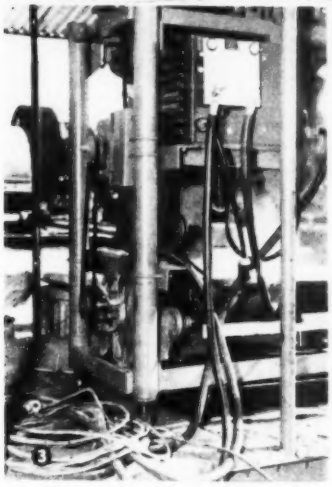






HARD-FACING TOOL JOINTS

A PORTABLE unit for hard-facing tool joints has recently been placed in field service for California drilling contractors. This marks the first appearance of such equipment on the West Coast.

The setup for the hard-facing operation is built around a standard electric head. It is readily moved and easily placed in operation at a pipe rack, yard, or well. The unit is provided with simple vertical adjustments for handling pipe of different diameters.

The hard-facing operation consists first of cleaning the tool joint, then preheating to 450° F. A special butane burner with a metal cover handles this step. After this the welding machine takes over and lays a covering of base metal to serve as a bond between the joint and the hard-facing alloy. The base metal is laid on in spiral form of five lands, ½ in. wide, ¾ in. center to center.

The alloy is laid in a spiral bead of four lands centering on the valleys of the base metal spiral. Following this step the joint is covered to prevent too rapid cooling.

The unit is operated by Ball, Black & Durkee Supply Co. for Tool Joint Hard Facing Co. In illustrations, hard-facing alloys of Stoody Co. are used.

1—Portable unit for hard-facing tool joints, at work on location. The unit is skid mounted and transported by truck

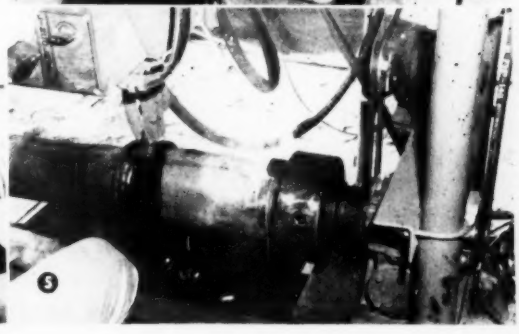
2—Before the tool joints are preheated they are cleaned by electric-driven rotary brush

3—The lathe chuck and lead screw which turn and move the tool joint and drill pipe during the hard-facing are driven by an electric motor via V-belts. There is a varidrive unit between chuck and lead screw; motor speed is regulated by a rheostat

4—Tool joint at top is being preheated inside butane burner. Joint at bottom is covered to slow cooling, following application of hard facing alloy. Note universal fixture in center, for positioning pipe

5—Spiral beads of the hard-facing alloy here are being applied by submerged electric arc

6—Facing completed for tool joint. Note how supporting fixture allows both rotary and sliding movement of pipe



*Additional copies of this advertisement available on request

Because of the numerous requests for reprints of page 15 in our Centrifugal Pump Bulletin 106 we reproduce it herewith*...

NET POSITIVE SUCTION HEAD

(Symbol NPSH)

A liquid can neither be "pulled" nor "sucked," but it must be forced by pressure into the impeller of a centrifugal pump. The term NPSH has been adopted to designate the pressure required to force a given number of gallons per minute of liquid into the impeller of a pump. For uniformity, NPSH is expressed as the head in feet of liquid equivalent to the required pressure in psi. over and above the vapor pressure of the liquid at the pumping temperature.

Each pump has its individual NPSH characteristics which are shown by the performance curve submitted by the pump manufacturer. The NPSH at any point on the curve is the head in feet of liquid equivalent to the pressure in psi. required to force the liquid through the passages from the suction flange to a point in the impeller where it is picked up by the vanes. The required NPSH shown on performance curves is based on actual tests and for the convenience of the plant design engineer, the values shown on the curves are corrected to the centerline of the pump.

The plant design engineer must locate the pump and design the suction piping so that the system NPSH available at the pump is equal to or greater than the NPSH required by the pump. An adequate system NPSH is necessary for the pump to deliver its rated capacity and to prevent cavitation. The system NPSH available at the pump may be calculated by the following formulae:

1. For a pump located above the level of the liquid to be pumped—

$$\text{System NPSH} = \frac{(P - Pv)\ 2.31}{\text{Sp. Gr.}} - (Z + H_f + H_e)$$

2. For a pump located below the level of the liquid to be pumped—

$$\text{System NPSH} = Z + \frac{(P - Pv)\ 2.31}{\text{Sp. Gr.}} - (H_f + H_e)$$

Where . . .

Z = Vertical distance in feet from the centerline of the pump to the level of the liquid.

P = Pressure on the surface of the liquid in p.s.i.a.

Pv = Vapor pressure of the liquid at the pumping temperature in p.s.i.a.

Sp. Gr. = Specific Gravity of the liquid at the pumping temperature.

H_f = Friction loss in feet head through suction pipe and fittings.

H_e = Loss of head in feet at entrance to suction pipe.

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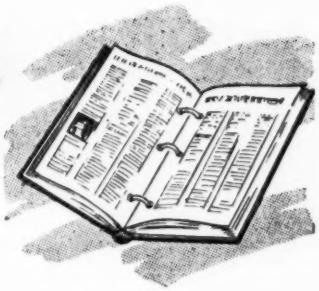
The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL



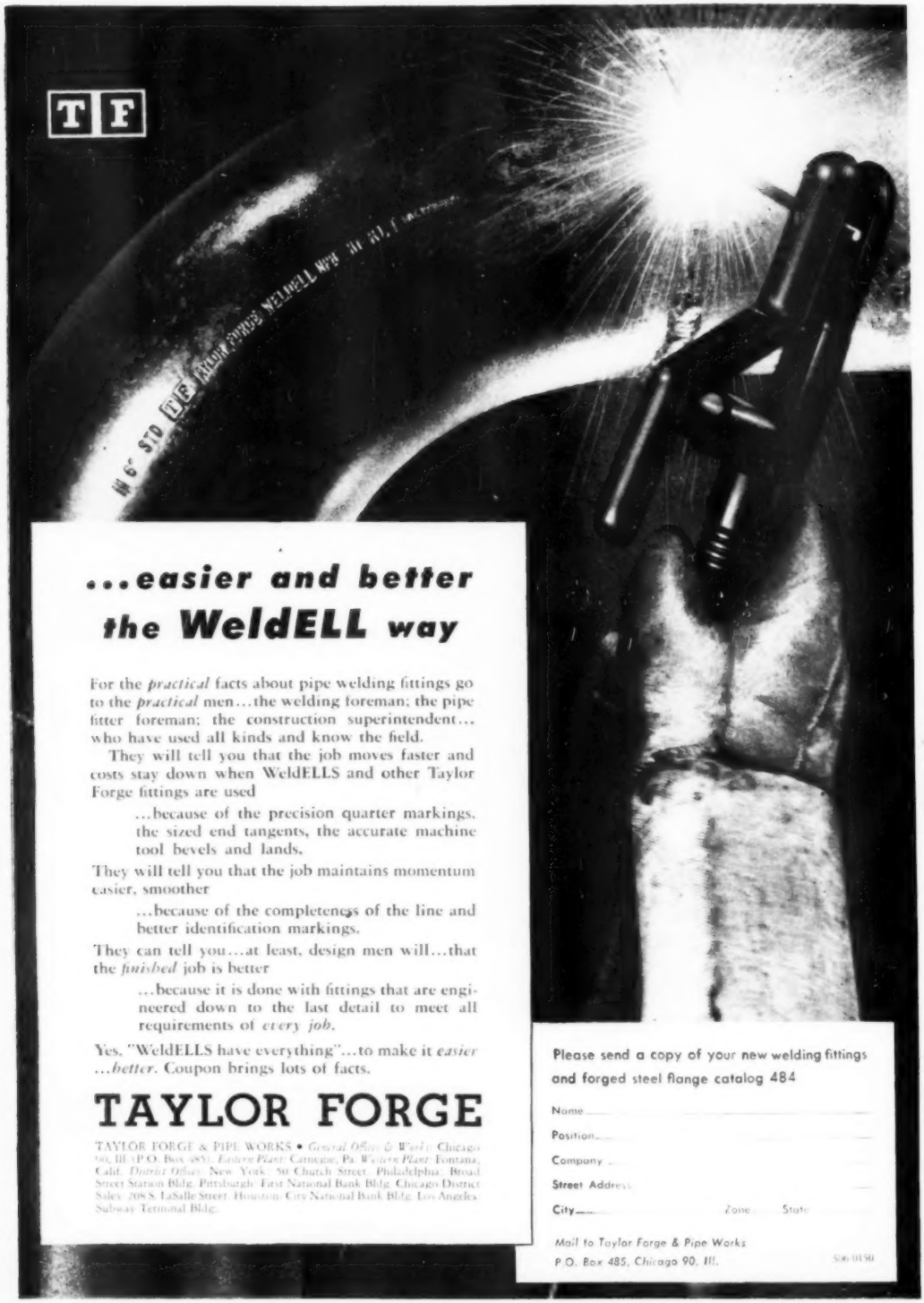
Storage Losses

CLASSIFICATION of storage tanks for petroleum and its products may be made according to operating principle as in Table 1. Loss characteristics as related to type of storage are noted. Other material on this subject appeared in the previous series of The Refiner's Notebook, specifically Nos. 1, 2A, and 4 to 7 inclusive (The Oil and Gas Journal, July, August, and September 1944).

TABLE 1—TYPES OF STORAGE AND VAPOR LOSSES

Classification	Operating Principle	Loss Characteristics
1. "PRESSURE" STORAGE TYPES	Fixed-volume tanks, permit pressure change within design limits. Liquid—plus—vapor volume is constant.	
FIXED ROOF (Low pressure, or atmospheric: conventional shape)	Includes conventional vertical cylindrical tanks, flat bottom with flat, cone, or dome (umbrella) roofs. Low-pressure storage is considered to be that in which vapor pressure is 15 psi. or less.	Low pressure-storage roofs may be gastight or not. Depending on construction, length of service, maintenance, etc., may be effective as regards vapor conservation only to very small pressures. Equip with gooseneck vents for less-volatile stock, and conservation vents for stocks with greater volatility. Breathing and filling losses will occur depending on vapor pressure of stock and settings of vacuum vent and pressure relief vent. Fixed-volume tanks (gastight) may be connected to variable vapor devices in vapor saving system.
FIXED ROOF (High pressure: special shape)	For working pressures below or above 15 psi., special tanks such as cylindrical vessels with hemispherical ends may be used. Other special shapes include the spheroid for pressures to 25-30 psi., or the sphere which is relatively economical design for working pressures of 25 to 100 psi. and for higher pressures in the smaller capacities. Cylindrical pressure vessels are used for large pressure ranges, high internal vacuums.	Special shapes such as spheroid and sphere are designed to withstand internal pressure high enough to prevent boiling of volatile stocks. Relief valve set at higher pressure. Breathing and filling losses reduced or eliminated. Spherical tanks may be used to store the more volatile grade of natural gasoline, butanes, or butane-propane mixtures.
2. FIXED VAPOR SPACE TYPES Floating roof	Variable liquid volume, roof in contact with liquid. Includes pan and pontoon types, and double-deck. Vapor space may be completely eliminated or a small volume of vapor may form under roof at greater temperature to be condensed again at lower temperature.	No filling or breathing loss in properly designed and maintained floating-roof storage.
3. VARIABLE VAPOR SPACE TYPES Breather and balloon roof; lifter or expansion roof; gas holders; vapor-saving systems	Breather roofs operate on the diaphragm principle, also "balloon" (bellows) roof. "Lifter" or "expansion" roof with liquid seal constitutes a gas holder mounted on and part of a variable vapor space storage tank. A new design of variable vapor-space tank consists of a hemispherical fabric diaphragm within a steel shell mounted on a cone-roof tank. Gas holders proper include the piston roof tank (dry seal gas holder) with counterweight, and balloon gas holders employing flexible vaporproof fabric diaphragms in spherical shape or cylindrical with hemispherical ends installed within a protective housing. Such devices, as well as the lifter or expansion roof tank may be manifolded to fixed roof tanks forming a vapor-conservation system.	Filling loss may occur in some variable vapor space tanks. No breathing loss in lifter or expansion-roof storage if lifter capacity is not exceeded.

No. 3 in new 1950 series. The "Refiner's Notebook" has been published continuously since 1944.



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TRADE LITERATURE

1 NORDBERG RADIAL ENGINE describes and illustrates this new 2-cycle, 11-cylinder, 14 by 16-in. engine which develops 1,800 hp. at 400 r.p.m., or 1,250 kw. A section view illustrates the distinctive crankshaft and gear assembly which provides perfect balance. A cross-section view of the entire engine and of the pressure system of lubrication and piston cooling is also shown. *Nordberg Manufacturing Co.*

2 PIPE-LINE SHOCK ABSORBER. Bulletin features four models of a compact shock absorber which eliminate shock and hammering in pipe lines. Description, applications, installation instructions, and list prices are included. *R-S Products Corp.*

3 TANK HEATING AND COOLING. Tank heating and cooling is vividly described and illustrated in a new six-page bulletin. A direct comparison is made between the Platecoil and pipe-coil methods of heat exchange. *Kold-Hold Manufacturing Co.*

4 INDUSTRIAL SAFETY EQUIPMENT CATALOG. In addition to providing product information on the company's line of eye and respiratory equipment, this 64-page book contains a fund of technical and reference material to help the user select the proper type and style of equipment for the specific occupational hazard involved. *Willson Products, Inc.*

5 FOR A REAL LIFT describes the new tapered sleeve splice which eliminates the necessity of sling users splicing their own sling loops. *John A. Roebling's Sons Co.*

6 CUTTING-IN VALVES AND SLEEVES is a four-page brochure dealing with sleeves and valves for use with cast-iron and sand-cast pipe. Drawings and photographs illustrate units and method of installation. *Eddy Valve Co.*

7 PLAY IT SAFE WITH FORESIGHT describes the mechanical joint, straight and bell, split sleeve in sizes 3 to 16 in., a test plug, and a test cap for use in repairing damaged water mains. *James B. Clow & Sons.*

8 ROBOTIZATION is a compilation of articles detailing the economic and industrial advantages and applications of Robotization, an engineering application of standard control instruments and electric, electronic, and pneumatic interlocks to accomplish all production and control operations. *Industrial Process Engineers.*

9 OIL IN CANADA is a brochure with pocket containing maps of the oil and gas-producing areas of Canada, and a short history of oil in Canada and in the United States. *Royal Bank of Canada.*

10 SPECIFICATIONS FOR PAINTING UNIT AREA EQUIPMENT is an exceedingly well-prepared man-

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OIL AND GAS EQUIPMENT Digest CHECK IT

ual for use of those engaged in maintenance of industrial and field equipment. Contains sections on acid-loading area treating area, ammonia-loading area, rundown tanks, ammonia reactivators, gas plant, hot-acid plant area, phosphate treating plant, and C. P. stabilizer area in addition to a list of materials used in specification grouped by composition. *Napko Paint & Varnish Works.*

11 McFARLAND CHEMICAL INJECTOR. Complete description and specifications of the new chemical injector are contained in the fully illustrated, two-color, four-page folder. *McFarland Manufacturing Co.*

12 BEHIND EVERY PRODUCT is a catalog of industrial controls for oil, gas, chemical, process, power, and heating installations and automatic control devices for fluid handling equipment. Includes sections on drainers or vent traps, liquid-level controllers, diaphragm control valves, self-operated regulators, relay regulators, drips and strainers, pilots and controllers, liquefied petroleum gas equipment, and engineering data and charts. *Climax Engineering Co. Controls Division.*

13 HYDRAULIC EQUIPMENT is a compilation of engineering data on a line of hydraulic pumps, axial piston type with constant and variable delivery. *New York Air Brake Co.*

14 PACKAGE STEAM GENERATORS, a two-color, 12-page data book, illustrates and describes units capable of producing steam up to 35,000 lb. per hour with oil, gas, or coal firing. The unit is completely factory assembled. *Foster Wheeler Corp.*

15 COUPLINGS AND FITTINGS illustrates the advantages of pipe couplings and fittings that can be installed by one man. Line includes tees, ells, reducers, crosses, valves, adapters, sprinkler mounts, and stabilizers. This coupling is ideal for temporary or portable installations. *McDowell Manufacturing Co.*

16 AUTOMATIC PRESSURE, FLOW, AND LIQUID-LEVEL CONTROLS. This fully illustrated catalog and engineering data book includes all pertinent information on pressure regulators; altitude valve; pump governors and strainers; lever, float, and motor-operated valves; pilot valves; back-pressure, relief, and nonreturn valves; steam trap and air vent; liquid-level controllers; solenoid valves; dia-ball unit and applications; and capacity charts. *Davis Regulator Co.*

17 WACHS NATIONAL PIPE SAW. A four-page, two-color folder illustrates applications for a pneumatic pipe saw capable of cutting iron or steel pipe from 12 to 48 in. in diameter. *E. H. Wachs Co.*

18 THE PETTER-FIELDING HORIZONTAL ENGINE lists special features, all engineering data, and dimensions, including engineering drawings of horizontal engines up to 80 b.hp. at 400 to 500 r.p.m. *Associated British Oil Engines, Ltd.*

19 CONSOLIDATED RECORDING OSCILLOGRAPHS is a new 16-page bulletin discussing the applications, operation, and features of these well-known multichannel recording oscillographs. Sample records of actual applications are presented along with detailed assembly drawings. *Consolidated Engineering Corp.*

20 5-MINUTE TOUR. With 18 photographs and brief explanatory copy, the bulletin takes Ajax gas engines from scrap and pig iron to final testing in the modern plant. *Ajax Iron Works.*

21 KAPCO ROCK SHIELD is a four-page brochure on the properties, uses and costs of a mastic composition board designed to protect pipe and coating from rock and other cutting or scraping surfaces. *Midwestern Engine & Equipment Co., Inc.*

22 HOW TO SET UP AND CONDUCT A SAFETY RX PROGRAM, contains information useful to any concern planning to establish or expand a program of eye safety through the use of prescription safety goggles. *American Optical Co.*

23 PRODUCTS AND SERVICES. This 64-page illustrated book briefly describes the products and services which Cyanamid offers to industry, and outlines the divisional structure through which such products are sold. *American Cyanamid Co.*

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THE OIL AND GAS JOURNAL
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OIL AND GAS EQUIPMENT Digest

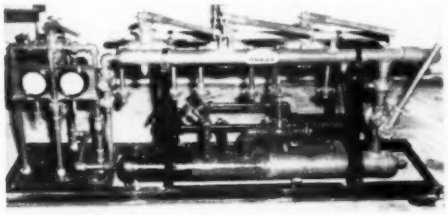
IT'S NEW CHECK IT

by Dan B. Miller

24 ROTO-VERT CASING SCRAPER for removing gunshot burrs, imbedded bullets, cement or mud sheath, and other similar obstructions from the inside walls of the casing, is intended to supplement, rather than to replace the Baker model "B" casing scraper. The Roto-Vert is recommended where it is desired to scrape away the mud sheath from top to bottom of the hole and or where a large number of gunshot burrs are to be removed. Six blade blocks are mounted and held in position by blade-block retainers. The blade blocks are set in two horizontal rows in a staggered position so that the scraper blades overlap and insure effective scraping of the full inside wall surface of the casing. Springs behind each blade block hold hard-faced scraper blades against inner wall of casing where they exert positive shearing action. *Baker Oil Tools, Inc.*

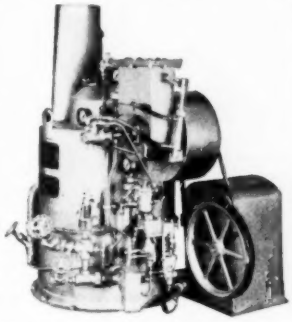
IT'S NEW CHECK IT

25 PREVENTER CONTROL MANIFOLD. A blowout-preventer control manifold designed to satisfy all requirements provides a compact distributing system for steam, water, and high-pressure operating fluid to the preventers, all skid mounted in a unit 30 in. wide and 10 ft. long with a lift chain at the center of gravity. Included is a platform for mounting the hydril control manifold which may be connected permanently to the high-pressure system and transported in a protected position. High-pressure connections into the unit are provided for boiler feed pumps, mud pumps, hand pump, auxiliary floor pump, steam, or hydril accumulator. Other connections provide outlet for water to the draw works and steam to the auxiliary pump. A mixing chamber provides water, steam, or hot water to the floor hose. *Portable Bridge & Equipment Co.*



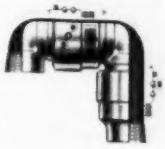
IT'S NEW CHECK IT

26 AUTOMATIC STEAM-GENERATING UNIT. A new type of steam-generating unit, designated as the Bettis 15 hp. Steamer, is designed to provide a ready source of steam on power drilling rigs. Used for heating the derrick floor where open flame is prohibited, for steam cleaning tool joints and other equipment, and for thawing motors and frozen equipment, the unit generates 300 lb. of steam pressure within 2 minutes after being started. Fired either with gas or diesel oil, the steamer is completely automatic and will maintain any selected steam pressure. Incorporated in the new design is a separate, two-cylinder enclosed feed pump, combination automatic water and fuel controls, and an automatic air damper control. *Bettis Corp.*



IT'S NEW CHECK IT

27 ALL-FLEX BALL BEARING SWIVEL PIPE COUPLING. Specifically designed to handle the conveying of fluids under high pressure through a pipe that rotates a full 360 in all planes, is streamlined throughout, has no projection and is free from bolted flanges, threaded sleeves, locking rings, and keys. The rotating members of the couplings are held tightly together with two sets of ball bearings operating in flame-hardened and ground ball races. All high-pressure swivel pipe couplings



The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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are made of steel. The low-pressure couplings are made of aluminum, bronze, malleable iron, or steel. They are available in a wide range of sizes, and for working temperatures up to 225° F. *Gil-Lair Products, Inc.*

IT'S NEW — CHECK IT

28 MODEL 26-102 TITRILOG. This is a highly sensitive and stable instrument for the automatic and continuous recording of concentrations of oxidizable sulfur compounds, such as SO_2, H_2S, mercaptans, thioethers, and disulfides in monitoring or control problems on gas streams or atmosphere. Sensitivity of the instrument is such that concentrations as low as 0.1 p.p.m. or 0.005 grains per 100 cu. ft. are recorded, yet its features include adjustments permitting the titration of sulfur compounds over a wide range of concentration. The instrument is especially suitable for the monitoring of sulfur compounds before and after the sulfur-removal treatment of natural gases and in the control of odorization of these gases. *Consolidated Engineering Corp.*

IT'S NEW — CHECK IT

29 LULL TRAVEL LOADER. For handling capacity loads of from 3,000 to 30,000 lb., the new side-loading hydraulic Lull Traveloader performs as a combination motor truck and forklift truck. It lifts, loads, unloads, stocks, and hauls steel, lumber, pipe, poles, spooled cable from 6 to 66 ft. long. In operation, a hydraulic lift tower slides out 72 in. to insert its forks under the load. The load is then brought aboard by hydraulic power, and deposited on the platforms. Used as a motor truck for runs of 50 ft. or 50 miles, it carries its own load at speeds up to 30 m.p.h. Unloading itself from the side, the unit stacks to any height from ground level to a deck-stacking height of 12 ft. Two retracting hydraulic stabilizer jacks on the loading side permit safe handling of maximum weights 12 ft. high, extended 64 in. beyond the body. Hydraulic tilt of the lift tower, 5° in or out, adds further safety and ease of load handling. *Lull Manufacturing Co.*

IT'S NEW — CHECK IT

30 KEN-OIL is a new oil-base drilling fluid. Field stock crude oil (18° to 24° gravity) or inexpensive refinery products such as light fuel oil can be used as the basic mixing material. To this is added Ken-Oil concentrate, in the ratio of 1 bbl. of concentrate to 9 bbl. of crude or fuel oil. The resulting drilling fluid (weighing approximately 58 lb. per cubic foot) has the desired characteristics of viscosity, gel strength, and fluid loss. For light weight muds (up to 75 lb. per cubic foot) Ken-Wate, a relatively inexpensive weight material, can be used with good results. For heavier muds, barite is used. In field practice, virtually the only maintenance needed is the addition of small amounts of domestic diesel, or higher-gravity crude oil, to reduce viscosity. In the event that the viscosity might be reduced below desired limits, addition of small amounts of Ken-Oil concentrate will effectively increase viscosity. *Ken Corp.*

IT'S NEW — CHECK IT

31 STRAIGHT CENTRIFUGAL PUMPS are for use primarily on installations with flooded suctions and are offered in close or long-coupled construction, 1 to 4-in. sizes and with capacities from 10 to 1,000 g.p.m. Consisting of casing, impeller with shaft sleeve, and the driving motor, the unit may be installed and operated in either vertical or horizontal position. Extremely simple in design, the new centrifugal features an easily renewable sealing ring at the suction inlet and deep-groove oversize ball bearings sealed against dirt and moisture. The stuffing box, an integral part of the casing, is designed to contain a liberal number of packing rings. Where desired, a John Crane mechanical-type self-lubricating dripless shaft seal is available. Other features include an enclosed-type impeller that eliminates need for a second wearing ring; volute, regularly of cast iron, can be of bronze, nickel, stainless steel, or other special alloy. *Marlow Pumps.*

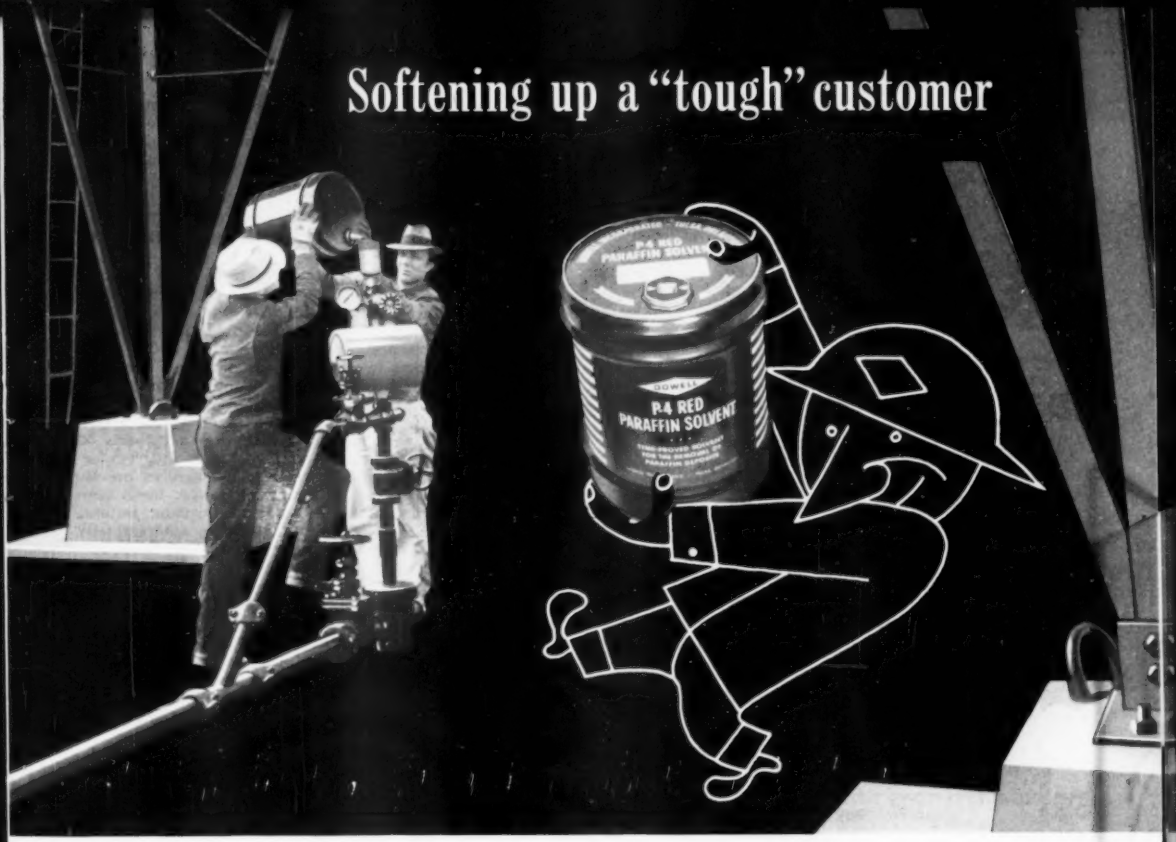
IT'S NEW — CHECK IT

32 EXPLOSIONPROOF INTERCOM SYSTEM introduced for hazardous areas is a fully selective, explosionproof, electronic intercom system that is particularly suited for plants where the atmosphere in work areas contains certain highly inflammable and explosive gases or vapors. Especially designed and constructed to meet the demands of heavy industrial usage, this system has Underwriters' Laboratories approval for Class I, Group D hazardous areas. Stations in hazardous areas can call other stations in either hazardous or non-hazardous areas. Another important operating feature of the system is its "remote reply." The person called, whether in a hazardous or safe area, can answer from any reasonable distance without stopping his work and without approaching his station or using his hands to manipulate switches. *Executone, Inc.*

IT'S NEW — CHECK IT

33 DOCTOR BOILER is a scientific preparation for the prevention and removal of boiler scale. It provides a microscopic film which covers the inside of the boiler and seals off the moisture and chemical action of the

Softening up a "tough" customer



DOWELL PARAFFIN SOLVENTS are first aid for production problems caused by paraffin deposits.

For a "tough" situation where paraffin deposits are gumming up the works, choose economical, time-tested Dowell Paraffin Solvents, designed to *increase production* in pumping or flowing wells by dissolving the toughest paraffin—even complicated by impurities such as salt and sand.

For example, the production of a dually completed, high-pressure well was cut by paraffin deposits in the tubing and annular space between tubing and casing. The well was shut in and Dowell Paraffin Solvent lubricated into the casing and tubing. The solvent was allowed to remain in contact with the paraffin deposit for several hours. *Result:* After one small Dowell Paraffin Solvent treatment, *the flow increased from 150 to 195 b.o.p.d.!*

Dowell Solvents have also proved effective in cleaning lead lines, tank bottoms, screens, liners, perforations and in rerunning rods.

For year-'round paraffin control, secure a supply of Dowell Paraffin Solvents from your nearest supply store or Dowell station. Ask for your free copy of "Time Proven Methods for Removal of Paraffin Deposits", an authoritative, handbook.

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PARAFFIN SOLVENTS

Ask your nearest Dowell station for complete information on these Dowell services and products: Acidizing, Electric Pilot Services, remedial Plastic Service, Chemical Scale Removal Service for heat exchange equipment, Jelflake, Paraffin Solvents and Bulk Inhibited Hydrochloric Acid.

"Petroleum Promotes Progress"

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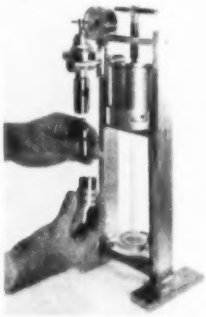
FOR OIL INDUSTRY CHEMICAL SERVICE

water from the scale itself. Thus the scale is dried out and the expansion and contraction of the metal, together with the "peptizing" action developed by the solution, causes the scale to leave the side walls of the boiler and the tubes and drop to the bottom of the boiler, to be flushed away. *Doctor Boiler, Inc.*

IT'S NEW ✓ CHECK IT

34 FANN MIDGET CYLINDER PRESSURE UNIT eliminates the use of air or nitrogen bottles on mud-filter presses now in the field. Pressure for the filtration test is supplied by thumb-size carbon dioxide cylinders that can be obtained almost everywhere. The unit eliminates the need for the bulky nitrogen cylinders now in use, and the inconvenience of shipping and receiving these cylinders. It is fitted in a sturdy carrying case. The case has accommodations for 10 carbon dioxide cartridges, enough for more than 30 filtration tests. *Magnet Cove Barium Corp.*

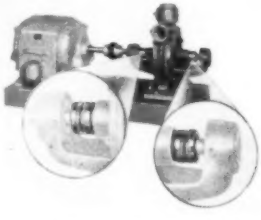


IT'S NEW ✓ CHECK IT

35 OIL-FIELD CORE BIT. This port bit has 300-g.p.m. mud capacity which flows at a lower velocity past the bit crown, greatly reducing the resistance to flow which eliminates bit bounce and thereby has reduced crown damage to a minimum. Due to the channel design the cuttings are immediately removed to prevent regrinding which has increased penetration speeds in all formations with reduced diamond wear and matrix abrasion. The jetting from the ports results in rapid shale and soft formation penetration and also eliminates any balled-up or burnt bits. *Koebel Diamond Tool Co.*

IT'S NEW ✓ CHECK IT

36 MASTER-BILT CONDENSATE AND BOILER-FEED PUMPS feature 100 per cent maintenance-free operation. The new pumps include both Fleximatic mechanical seals which eliminate pump packing altogether, and permanently lubricated ball bearings. Magnified view illustrates external appearance of the Fleximatic mechanical seal which never leaks and cannot score the pump shaft. Special design feature of Fleximatic seal is automatic adjustment of seal face tension proportional to internal pump pressure, plus ability to take up for nominal axial misalignment. A unique characteristic of this seal is its ability to run dry if necessary for several hours without burning up the seal faces. *Fred H. Schaub Engineering Co., Inc.*



IT'S NEW ✓ CHECK IT

37 INERT GAS GENERATORS. Models 1 MIHE and 2 MIHE, rated at 1,000 and 2,000 cu. ft. per hour respectively the new inert gas generators obtain the same analysis of inert gas regardless of demand. Adjustment can be set to be free of O^2 in the presence of a small amount of combustibles, or completely free of combustibles in the presence of a small amount of O^2. Water vapor is equivalent to saturation at discharge temperature. Accurate carburetion assures complete combustion, to produce a clean, pure, chemically inert gas. Fully automatic in operation, the initial starting is by push button and manual valving after which the unit floats on the line in response to changes in demand. It gives accurate proportioning of gas and air, and assures precise inert-gas analysis over full operating range. Ratio control adjusts for manufactured, natural, propane, butane, or refinery gases. An effective fire check automatically shuts off fuel supply to burners in cases of flashback. *C. M. Kemp Manufacturing Co.*

IT'S NEW ✓ CHECK IT

38 CARBON DIOXIDE FIRE EXTINGUISHER is a new, portable 6-lb. carbon dioxide fire extinguisher with 20 per cent additional fire-fighting capacity. It is a compact, lightweight unit, featuring thumb-trigger release and self-aimed nozzle. Only one hand is required to operate this CO_2 extinguisher, from the instant it is removed from its bracket until the flames are extinguished. The extinguisher contains 6 lb. of nontoxic, nondamaging carbon dioxide gas, and is especially adapted to smother flammable liquid and electrical fires. It is approved by the Underwriters' Laboratories, and in Underwriters' official tests it extinguished a 16-sq. ft. gasoline fire in 7½ seconds. *Randolph Laboratories, Inc.*

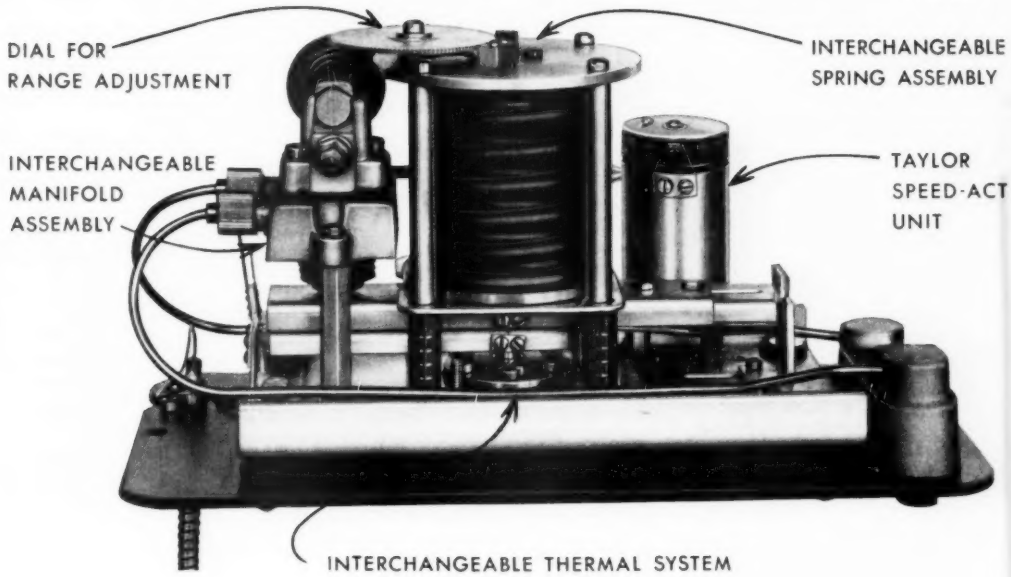
IT'S NEW ✓ CHECK IT

39 LOW-TORQUE ROTARY SWIVEL JOINT for swivel and slow revolving applications. The design of this joint eliminates wedge action of the ball against the gasket, thus turning torque is almost completely eliminated. The ball is held in place by a Belleville spring. It is unique in that a small amount of side flexibility reduces the possibility of wear or breakage from side strain. It performs without leakage at extreme temperatures and extra-heavy models are available for extreme pressures and vacuums. Successful performance has been obtained at continuous rotation up to 30 r.p.m. It will handle practically all fluids and gases including corrosive acids and alkalis. Presently available in 90° angle and straight designs in ⅜ to 1-in. pipe sizes. *Barco Manufacturing Co.*

Only TRANSAIRE, Taylor's New Temperature Transmitter gives you*

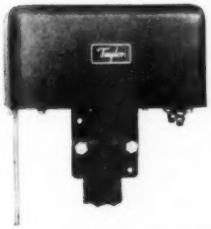
DYNAMIC ACCURACY
DYNAMIC COMPENSATION

* Trade-Mark



DYNAMIC ACCURACY means the accuracy of an instrument in measuring changing or dynamic conditions. Transaire's Dynamic Accuracy is unparalleled. It solves the problem of process engineers who realize that an instrument accurate to a fraction of a degree in measuring static conditions can be in error by many degrees when temperature is changing.

DYNAMIC COMPENSATION means the ability to compensate for inherent lags both in measuring system and rate of heat transfer of process medium. Transaire does this by introducing derivative action (Speed-Act) into the *measuring* circuit. The result is Dynamic Accuracy, with a speed of response seldom thought possible which permits better automatic temperature control.



Transaire Transmitter with Speed-Act, an entirely new force-balance instrument that transmits temperature *pneumatically* as far as 1000 feet with extremely high accuracy. *Speed-Act* compensates for thermal lags caused by a separable well or poor heat transfer of process medium. Result—the first instrument with Dynamic Accuracy under such adverse conditions. You also get:

1. Barometric and Temperature Compensation, exclusive with Taylor, is vitally important where close temperature measurement and control are critical.

2. Standard Output Pressure Range of 3 to 15 psi cuts maintenance, eliminates need for special calibration of receivers.

3. Cigarette-Size Bulb has small heat capacity, speeds up response.

OTHER IMPORTANT ADVANTAGES ARE:

Faster—63.2% response in less than 2 seconds.

Temperature limits: minus 375° to plus 1000° F.

Short, shiftable range spans. Simple screwdriver adjustment.

Great overrange protection. All thermal systems, regardless of range limits, have overrange protection to 1000° F.

No electrical hazard in explosive atmospheres.

Positive-acting pilot valve assures rapid transmission.

Write for **Bulletin 98140** on Transaire Temperature Transmitter, and **Bulletin 98099** for companion Transaire Pressure Transmitter. Ask your Taylor Field Engineer. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.

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FRANK O. PRIOR
Vice President, Standard Oil Company (Indiana)

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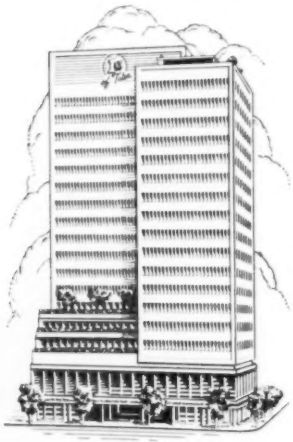
President, Warren Petroleum Corporation



1895 — 1st of Tulsa — 1950

STATEMENT OF CONDITION

December 31, 1949

RESOURCES

Cash and Due from Banks	$56,339,216.01	
U. S. Government Securities	85,389,289.52	$141,728,505.53
Other Bonds and Securities		7,828,907.97
Loans and Discounts		49,722,253.81
Federal Reserve Bank Stock		240,000.00
Income Earned, Not Collected		348,584.95
Future Banking Quarters		1.00
Equipment—New Banking Quarters		54,930.17
Furniture and Fixtures		1.00
Customers' Liability Under Letters of Credit		25,000.00
Other Resources		16,024.80
		$199,964,209.23

LIABILITIES

Deposits		$188,714,813.65
Income Collected, Not Earned		288,114.77
Taxes, Interest and Expense—Accrued		575,843.62
Letters of Credit Outstanding		25,000.00
Capital	$3,000,000.00	
Surplus	5,000,000.00	
Undivided Profits	2,360,437.19	10,360,437.19
		$199,964,209.23

THE FIRST NATIONAL BANK AND TRUST COMPANY OF TULSA

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

NATURAL GAS

Hearing Is Postponed On El Paso Proposal

HEARING on the application of El Paso Natural Gas Co. to build a 451-mile natural-gas line from the San Juan basin to the Arizona-California border, which had convened in Washington, D. C., has been postponed by Federal Power Commission until April 17, at the request of an El Paso attorney, who stated it wants more time to get definite contracts for gas to supply the line.

El Paso's application has been before FPC for a number of months. Also pending in connection with the firm's proposal is an application by Pacific Gas & Electric Co. of California to enlarge its facilities to transport a maximum of 400,000,000 cu. ft. of gas daily from Topock, Ariz., to northern and Central California. FPC last February authorized P. G. & E. to construct a line from Topock to the San Francisco Bay area to transport 250,000,000 cu. ft. of gas daily, to be supplied by El Paso from the Permian basin in Texas and New Mexico. It is this line which P. G. & E. would enlarge in capacity in order to transport an additional 150,000,000 cu. ft. daily from the San Juan basin.

Allen R. Grambling, attorney for El Paso Natural, said that the firm has not yet been able to get its contractual position outlined in a "position to go forward at the hearing."

The 451-mile line would deliver 165,000,000 cu. ft. of gas daily from the San Juan basin to Topock.

During the hearing last week in Washington, new figures on gas reserves of the San Juan basin were presented. R. R. Spurrier, director of the New Mexico Oil Conservation Commission, placed proven gas reserves of the basin at 2,234,481,300,000 cu. ft., and semiproven reserves were estimated at 11,666,598,300,000 cu. ft. by F. C. Barnes, assistant New Mexico geologist.

Transcontinental's Line to Deliver Gas by November 1

Transcontinental Gas Pipe Line Corp.'s 1,840-mile natural-gas line from the Rio Grande Valley of Texas to the New York City area, will make its initial delivery of gas into New York City around November 1, according to Claude A. Williams, president of the pipe-line firm.

The line will thus be the first to make a large-scale delivery of natural gas into Manhattan, Brooklyn, and Long Island, Williams said.

Distribution of the gas delivered by Transcontinental will be through existing privately owned utilities in the Philadelphia-New Jersey - Metropolitan New York region, Williams revealed, which include Consolidated Edison Co. of New York, Brooklyn Union Gas Co., Kings County Lighting Co., Brooklyn Borough Gas Co., Long Island Lighting Co., Public Service Electric & Gas Co., Elizabethtown Consolidated Gas Co., South Jersey Gas Co., and Philadelphia Electric Co.

First segment of the line extending over 600 miles from Eunice, La., to Athens, Ga., which was begun in May, is almost completed, Williams said. Contracts have been let on nine construction spreads totaling 707 miles which will take the line from Athens to the Hudson River crossing at 132nd Street, New York City. Contractors plan to work throughout this winter. The southernmost portion of the line, 514 miles from Eunice to Mercedes, Tex., the Rio Grande Valley terminus, will be started in February. Separate contracts have been let to carry the line under the Hudson and Mississippi rivers, and to bridge other rivers, including the Coosa River in Alabama.

The firm now has before the Federal Power Commission an application seeking to increase the line's authorized capacity from 340,000,000 to 505,000,000 cu. ft. daily. If the request is granted, the company will change several miles of pipe at the northern end and 200 miles of line at the southern end from 26 to 30-in. diameter, Williams said.

AEC to Invite Proposals on Gas System for Oak Ridge

The Atomic Energy Commission told The Journal last week that it is preparing to invite proposals in the near future for the construction and operation by private interest of a natural-gas utility system in the town of Oak Ridge, Tenn.

In addition, more detailed information concerning the town and the conditions of service expected to be met will be given to prospective utility firms by AEC. The town is still unincorporated, and although it is located on a Government reservation, is subject to the laws of the State of Tennessee.

Construction of a high-pressure natural-gas pipe line to the Oak Ridge area was recently completed and delivery of gas to the AEC for use in its plants has already been initiated. AEC said it proposes that from this supply of gas it will make available by sale to a private utility company sufficient gas to serve the commercial, residential, and possible future industrial customers' needs in the town of Oak Ridge on a normal commercial basis.

Complete information will be available to prospective utility firms by January 23, AEC reported.

Firms Seek More Gas for Morgantown, W. Va., Area

Monongahela Power Co. and its subsidiary, State Line Gas Co., Fairmont, W. Va., are asking Federal Power Commission to issue an order directing Manufacturers Light & Heat Co. to supply them with a total minimum of 1,000,000 cu. ft. of gas daily during cold-weather months, for distribution in the Morgantown, W. Va., area.

The firms are at present supplied with gas by Hope Natural Gas Co., Pittsburgh & West Virginia Gas Co., Carnegie Natural Gas Co., and independent producers.

Additional gas is needed to meet an "emergency heating problem" in the Morgantown area brought on by installation of 765 new gas-heating installations since early 1949, the companies said.

Additional facilities would be constructed to receive the gas from Manufacturers.

Eastern Natural Withdraws New England Pipe-Line Bid

Eastern Natural Gas Corp. has been permitted by Federal Power Commission to withdraw its application which proposed construction of a $28,000,000 natural-gas pipe-line project from Phoenixville, Pa., to Boston. A motion was filed by the firm last December 19 to withdraw its application, which originally was filed in June.

Eastern proposed to build the main 292-mile, 24-in. line and approximately 200 miles of sales lateral lines, and the project was designed for an initial capacity of 200,000,000 cu. ft. of gas daily for sale at wholesale to public utilities or municipalities operating distribution systems in communities in New England.

Seeking More Natural Gas

Illinois Power Co., Decatur, has filed a formal protest to Federal Power Commission against natural-gas allocations to utilities served by Panhandle Eastern Pipe Line Co. Allen Van Wyck, president, said Illinois Power is allowed only 10.48 per cent more volume for its firm-rate customers than last year, while other firms were allowed 18.17 to 64.93 per cent more gas for this service.

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LUBRICATORS
A modern lubricator for modern service on Diesel, gas, steam engines and compressors. Supplies dependable cylinder lubrication in metered quantities reducing friction and wear. Capacities: 2 to 24 pt. and 1 to 24 feeds. New catalog on request.
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Among the
Drilling Contractors

Drilling Contracts Let for Pelee Island Development

Drilling contracts have been let to H. H. Stubble & Sons of Chatham, Ont., and equipment is being moved in for initial tests of an extensive development being undertaken by Lake Erie Oils of Canada, Ltd., on Pelee Island, in Lake Erie, south of Essex County, Ontario.

The new program calls offsetting all 29 wells which were drilled late in the last century in development of shallow productive horizons, the Salina and Guelph formations at depths of 740 to 904 ft., and exploring the potentialities of the deeper Trenton limestone around 2,000 ft., which yielded oil and gas showings in an early deep test.

Sager Quits Brinkerhoff

Bert Sager, superintendent of drilling operations for Brinkerhoff Drilling Co., Casper, Wyo., has resigned this position to retire for the immediate future, to a farm he owns near Sumner, Ill. He has been associated with Brinkerhoff since 1938, starting in Illinois, and has been engaged in oil-field work since 1923.

Gulf Adds Rig at Stettler

Canadian Gulf Oil Co. is stepping up development in the Stettler area, Central Alberta Province, Canada, with a company rig being moved in from the United States. This rig will supplement the three contract rigs, two by **Regent Drilling Co.**, Edmonton, and one by **Parker Drilling Co.**, Tulsa, now running in the area. Regent's operations are near Gulf's D3 zone discovery well. Parker's rig is on an exploratory test located several miles to the south.

ROTARY RIGS IN OPERATION*
(United States and Western Canada)

Area	Week ended 1-9-50	Change week ended 1-2-50	Change week ended 1-10-49
Gulf Coast	501	+ 5	— 41
W. Tex.-N. M.	704	— 4	+ 111
Ark.-N. La.-E. Tex.	137	—16	— 45
Oklahoma	235	— 8	— 10
Kansas	113	— 8	+ 3
Illinois-Eastern	95	—13	— 6
Rocky Mountains	74	— 5	— 68
Pacific Coast	132	+ 6	— 44
Total United States	1,991	—43	—100
Western Canada	78	0	+ 11
Total	2,069	—43	— 89

*Courtesy Hughes Tool Co.

Dick Wegener, Oklahoma City, is starting work on a projected 7,500-ft. wildcat test, 1 Qualls, in 23-1n-7w, 3 miles northeast of Duncan, Stephens County, Oklahoma. It is being drilled for his own account.

Commonwealth Drilling Co., Calgary, is moving a rig into the Excel-

Cactus Drilling Co., San Angelo, Tex., is one of many contractors now active in the Scurry County, Texas, play. Shown at one of its rigs running for Lion Oil Co., in the Diamond M area are, left to right: Noel Godberry, toolpusher; H. A. Blackwell, driller; J. D. McWilliams, J. D. Sullivan, and L. T. Whitsett, crew members.

sior area in Central Alberta Province, Canada, where it has a contract to drill for Pacific Petroleums, Ltd., at a location a mile east of the discovery well recently completed by Imperial Oil, Ltd.

Penrod Drilling Co., Shreveport, is moving in tools to drill a projected 5,000-ft. wildcat test for H. L. Hunt at a location 1½ miles north of Rogers, in 25-7n-2e, LaSalle Parish, eastern Louisiana.

Art Logan is drilling for C. L. Brosiue at a recently started well, 2 Pickett, in 12-17n-8e, on the southeast side of the Olive district in Creek County, Oklahoma.

Vern Trimble Drilling Co. is the contractor for Spartan Drilling Co. at 1 Everett, a wildcat test being started near Nick Springs, in 36-17s-15w, Union County, Arkansas.

Commonwealth Drilling Co., Calgary, has a new wildcat operation under way in the Winterburn area, south of Edmonton, Alta., Canada, where it is drilling for California Standard Co. at Winterburn-Province, in LSD 10, 4-53n-25w4. The area is 10 miles north and a little east of the Leduc-Woodbend field.

Slusser Drilling Co., Marion, Kans., is drilling for Yonker & Son at 1 Larson, 16-16s-3e, 8 miles west of Herrington, Dickson County, Kansas.

Two new contracts awarded **E. A. Rumley**, Oklahoma City, include one for a well to be drilled for Ashland Oil & Refining Co. in the race track circle on the state fairgrounds at Oklahoma City. The location, in 36-12n-3w, is on the east flank of the Oklahoma City field. Hole is projected to 6,800 ft. for a Wilcox sand test. The other contract is for a wildcat test near Cashion, Logan County, Oklahoma. The latter will be for Deep Well Oil Corp. It is 1 Stoner, located in 29-16n-47w. It also is projected to the Wilcox sand.

T. M. McCasland tools are being used on a new well being started by Shell Oil Co. at 4-B Burkes in the Knox pool, Grady County, Oklahoma. Location is in the NE SE SE 17-3n-5w.

Glenn Nye Drilling Co., Hays., Kans., has a rig running for Doley Oil Co. on a wildcat test, 1 Witt, located in 33-12-16, a mile northwest of the Emmerman pool, eastern Ellis County, Kansas.

Ben F. Brack, Wichita, has moved a rig to a wildcat location 2 miles northeast of the Ash Creek field, Barton County, Kansas, where he will drill for Baum Oil Development Co. at 1 Unrug, 28-20e-15w.

Big Chief Drilling Co., Oklahoma City, is starting another well in the Oldenburg field, Franklin County, Mississippi, for William Helis of New Orleans. It is 2 Board of Supervisors, in 16-7n-2e.

Olsen Drilling Co., Tulsa, has rigged up for a 7,000-ft. Hunton lime test to be drilled for itself on a location near the Northwest Cashion pool, Logan County, Oklahoma. The well is 1 Peckham, in 26-16n-5w.

Milton Crow, Inc., Shreveport, has acquired two new contracts, both for wildcat tests in Union County, Arkansas. One is from British American Oil Co. for 1 Sheppard, located in 15-19s-17w, 1½ miles south of Three Creeks. The other is from Spartan Drilling Co. for 1 Irby, in 22-18s-17w, 2 miles south of the Cairo field. Crow holds an ownership interest as well as the contract in the former.

Creighton Drilling Co., Tulsa, has taken a contract from **Arrow Drilling Co.**, Tulsa, for a well to be drilled northwest of old production in the Keokuk pool, Pottawatomie County, Oklahoma. The location, in 14-11n-6e, is about 4 miles south of Prague. Hole is projected to 3,800 ft.

Corbett-Barbour Drilling Co., Tulsa, has a rig running for Flynn Oil Co. at a wildcat location 5 miles north of Carney in northwestern Lincoln County, Oklahoma. The test, 1 Bracksieck, is in 2-16n-2e.

Arrow Drilling Co., Tulsa, has acquired two new Canadian drilling contracts one for a wildcat to be drilled for A. G. Bailey & Co. at 1 Spedden, LSD 5, 1-60n-13w4, 75 miles northwest of Edmonton, and the other for Central Leduc Oils, Ltd., and associates at 2 Excelsior, in LSD 16, 31-55n-24w4, 2½ miles southwest of the Imperial Oil, Ltd., discovery well in the Excelsior area.

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PIPE LINES

Transcontinental Delays South Section Contracts

TRANSCONTINENTAL GAS PIPE LINE CORP. (Fish Constructors, Inc., direction) has delayed asking for bids on the 530-mile, Eunice, La.-Mercedes, Tex., section of its Texas-New York City line until Federal Power Commission passes on the company's application to use larger diameter pipe for parts of the system.

The company is seeking permission to use 30-in. instead of 26-in. in a 200-mile section immediately west of the 605-mile, Louisiana-Georgia section now nearing completion. (See related story on page 87 of this issue.) The remainder of the Eunice-Mercedes section will be laid with 26-in. with the exception of approximately 70 miles of 20-in. at the south end.

Hearings have been in progress on the Transcontinental case before FPC this month and there appear to be prospects for a fairly early decision possibly leading to the issuance of a temporary permit which would facilitate contracting the part of the system southwest of Eunice.

Work is nearing completion on the 605-mile, 30-in., Louisiana - Georgia section. Morrison Construction Co. and Midwestern Constructors, Inc., have finished their sections. Wunderlich and Griffis are nearly through with work in Mississippi. Williams Brothers Corp. has laid most of the pipe for the section in Georgia included in this initial 605-mile program.

For the second group of contracts let from Georgia to New York City, work is only in progress at a small spread of Oklahoma Contracting Co., supervised by Panama Shifflet, spreadman, in a 30-mile, New Jersey section between Elizabeth, N. J., and the Hudson River.

In the letting of contracts for this Georgia-New York program, escape clauses were included in some of the contracts which would allow Transcontinental to substitute 30-in. for 26-in. pipe in sections aggregating 200 miles in Pennsylvania and New Jersey, if permission for doing this be obtained from FPC.

The crossing at the Hudson River to 132nd Street, New York City, is to be laid in the river bottom with the jetting method.

On the Manhattan Island side of the crossing location, a meter station is now being built for Transcontinental by Raymond Concrete Pile Co.

Interstate Extends Lines In Louisiana, Mississippi

Interstate Oil Pipe Line Co. recently laid 7½ miles of 3 and 4-in. line to connect the Humble Oil & Refining Co. gasoline plant with its existing Southwest Louisiana crude-oil trunk-line system at a point about 1 mile east of Sunset, La. Townsend Construction Co., Bunkie, La., was the contractor on this job.

In Claiborne Parish, Louisiana, Interstate has installed a crude-oil gathering system to serve the Athens field, about 9 miles southeast of the town of Homer. Included in the new system are 5½ miles of 4-in. line, 6 miles of 2-in. line, and six field pumping units. The Athens gathering sys-

Lowering in 30-in. pipe in construction near Bassfield, Miss., for the Transcontinental Gas Pipe Line Corp. system being built under the direction of Fish Constructors, Inc.

CRC

PIPE LINE CONSTRUCTION EQUIPMENT

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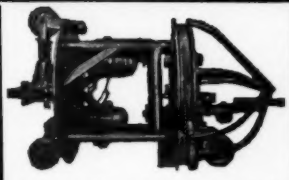

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tem connects with Interstate's Weller-Sugar Creek line at a point about 10 miles east of Weller Station, La. J. C. Moore, Magnolia, Ark., was contractor on this job.

In Franklin County, Mississippi, Interstate has begun gathering operations in the Bude field, approximately 10 miles south of Meadville. The newly installed system includes 7½ miles of 4-in. line and three field pumping units, and makes connection with the company's crude-oil trunkline system at a point 12 miles north of Liberty pump station. Clyde A. Hurst, Laurel, Miss., received the contract on this project.

Wilcox Oil Buys Shell's Cushing Gathering System

Shell Pipe Line Corp. has sold its Cromwell - Cushing, Okla., gathering system to Wilcox Oil Co., Tulsa.

While the sum involved was not disclosed, the sale includes 72 miles of 4 and 6-in. pipe line traversing Seminole, Okfuskee, Lincoln, and Payne counties, Oklahoma.

Test Bomb Used for Study Of Pressure-Wave Surges

Saving of steel in construction of pipe lines was made possible by findings on the "water hammer" phenomena released by Northwestern University's Technological Institute. The new data will reduce breakdowns, leaks, and damage to oil and gas pipe lines formerly caused by pressure-wave surges.

Prof. Lewis H. Kessler and Merrill B. Gamet of Northwestern's civil-engineering department have designed a "test bomb" for computing the bulk modulus of elasticity of various kinds of crude oils and gasolines from high pressures to low pressures and at temperatures from freezing to boiling. These figures, never before computed for the range of pressures and temperatures found in long pipe lines, will be available to all operators in the United States and to engineering organizations.

The Northwestern engineers explained that pressure - wave surges occur in all pipe lines when valves are closed too rapidly, and that surges may destroy valves, spring leaks in pipe joints, or even result in explosions from weak joints. They compared closing a valve to dropping a steel door in front of a speeding automobile, for the oil or gasoline moving along inside a pipe has a tremendous amount of moving energy. The pressure wave is set up when valve is closed, and the wave speeds along the fluid in the pipe until it is reflected from the source at the other end. If the pressure wave returns to the closed valve before the moving energy is dissipated, explosive pressures develop.

What the Northwestern engineers

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have done is design equipment, which they call a "test bomb," to determine the bulk modulus of elasticity, a figure necessary to find the speed of the pressure wave in oil and gasoline. They vary the pressure with a series of lead weights, and the temperature is changed by the heated water or ice placed about the test bomb. Their equipment is relatively simple. It is expected that the test bomb will be available for oil companies soon.

Water-hammer surges can be computed and anticipated so that valves may be regulated to offset damaging effects. It is now possible to determine the correct thickness of metal in large pipe.

The tests made by the Northwestern scientists were part of a research program of the Joint Surge Conference, sponsored by Middle East Pipelines, Ltd., Trans-Arabian Pipe Line Co., and Gulf-Shell Pipe Line.

Route of Tapline Project Extends for 752 Miles

Trans-Arabian Pipe Line Co.'s (Tapline) project is now regarded as starting from the initial pump station at Qaisumah, Saudi Arabia, where crude is received from Arabian American Oil Co.'s concentration tanks. From Qaisumah the route of the line now under construction extends 752 miles to the Sidon, Lebanan, terminal site on the Mediterranean.

International Bechtel Corp. and Williams Brothers Overseas Corp., the construction contractors, are working for completion scheduled by January 1, 1951.

The 315 miles of 30 and 31-in. feeder line from Abaqaiq to Qaisumah, completed January 1, is owned and operated by Arabian American Oil Co. Connecting as it does with Tapline at Qaisumah, this 315-mile project is integrated as part of Tapline's Persian Gulf-Mediterranean system.

Bechtel crews are going northwest from the Persian Gulf, and spreads of Williams Brothers proceeding southeast, are working in a section which skirts the northern boundary of Palestine, where it follows a route 16 miles north of Lake Tiberias (the Sea of Gallilee) and 32 miles northeast of Nazareth.

New York Gas Firms File New Motions Before FPC

New York State Natural Gas Corp. has filed two applications with Federal Power Commission, both proposing construction of pipe-line facilities designed to make additional natural gas available to consumers in Pennsylvania and New York, including New York Power & Light Corp. and Central New York Power Corp.

Meanwhile, the latter two companies have filed with FPC a joint application for authorization to construct facilities to receive the gas from New York State Natural for delivery to markets in New York State.

New York State Natural is proposing in one application to enlarge the transmission and underground-storage capacity of its system to keep pace with consumers' requirements. This project includes construction of 53.5 miles of 16-in. loop line in Pennsylvania extending from a compressor station in Greene County to another station in Westmoreland County. In addition, the company proposes to replace several sections of pipe at two storage pools, one in Tioga County, Pennsylvania, and the other in Potter County, Pennsylvania. Total estimated cost of the program is $2,592,582.

In its second application, New York State Natural sets forth plans for enlargement of its system and underground-storage capacity to enable it to deliver additional gas to Central New York Power and to New York Power & Light for distribution in Albany and other districts now served by them in New York State.

The company said that these additional facilities, estimated to cost $13,007,222, would permit it to supply the two customer companies with enough gas to meet their present and future requirements.

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For complete information write for Bulletin No. 28-B.

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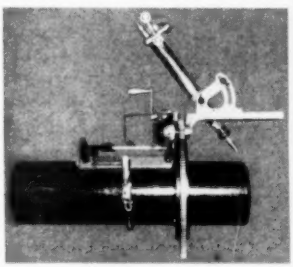

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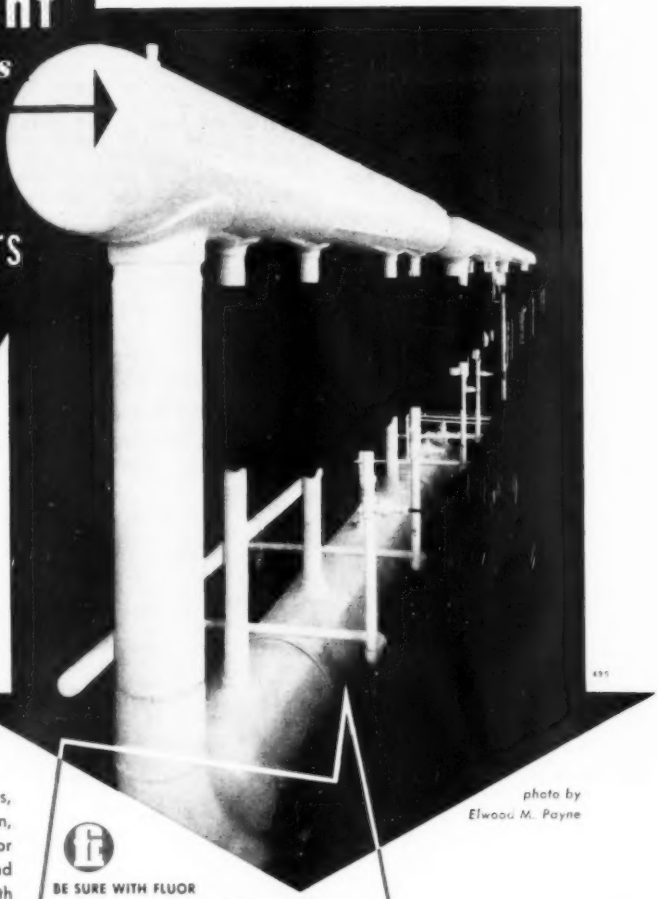

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photo by Elwood M. Payne

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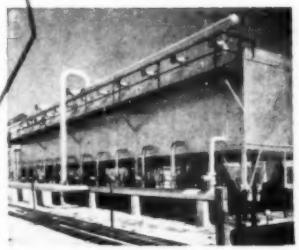

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REFINING

Shreveport Site of W.P.R.A. Regional Technical Meeting

Shreveport will be the site of the first of a series of 1950 regional technical meetings sponsored by the Western Petroleum Refiners Association, John C. Day, Tulsa, executive secretary, announced. The meeting will be held on Friday, February 24, at the Washington-Youree Hotel.

Day said that a questions-and-answer program is being planned, with six refinery experts—two from member refineries and four representing engineering and processing companies—answering questions. These include Harold Bottomly, vice president of Refinery Engineering Co., Tulsa, and Davis Reed of Universal Oil Products Co., Chicago. They will discuss, along with the other refinery experts, questions covering all phases of refinery operation. Questions are now being submitted by W.P.R.A. member companies for screening, Day said.

Paul D. Williams, Tulsa, association technologist, will assist with arrangements in Shreveport, Day said.

Hutex Refinery at Hardin, Tex., Is Being Dismantled

Hutex Oil & Refining Co.'s skimming plant at Hardin, in Liberty County, Texas, is being dismantled and sold piece by piece, the company reported.

The refinery was shut down on November 15, 1949. Its capacity was rated at 1,000 bbl. of crude charge daily.

Petroleum Advancements to Highlight A.C.S. Meeting

The Houston session of the 117th national meeting of American Chemical Society, which will meet at the Shamrock Hotel March 26, will be highlighted by advancements in the petroleum industry.

New petroleum products, recently developed methods to increase oil production, and a review of the first half-century of the sulfur industry, will be taken up in reports scheduled by 10 of the society's divisions.

The chemist's role in maintaining a smooth pace of machine-age America through the synthesis of lubricating oils will be one of the topics under consideration.

Dr. H. E. Morris, chairman of the Houston section, and Dr. L. B. Odell of the James Bute Co., Houston, co-chairman, will be in charge. B. H. Shoemaker, Standard Oil Co. (Ind.), will preside over the symposium on synthetic lubricants.

"Chemicals from Petroleum" will be the theme of one of the principal symposia at the meeting, with Max Neuhaus, of Jefferson Chemical Co., New York City, serving as chairman. The symposium will be jointly sponsored by the gas and fuel division of the petroleum division, Division of Industrial and Engineering Chemistry.

The petroleum division will conduct a symposium jointly with the water, sewage, and sanitation chemistry division on the conditioning of water for repressuring oil fields, and for underground disposal. H. M. Smith, U. S. Bureau of Mines, Bartlesville, Okla., will serve as chairman.

The Houston session will continue until March 30. The Philadelphia session will convene April 9-13; and the Detroit session April 16-20.

Great Lakes Oil Co. Plans New Ohio River Terminal

Great Lakes Oil Co. of Pittsburgh is planning to operate its own terminal on the Ohio River at Vanport, Pa.

The firm announced the installations will have a storage capacity of 40,000 bbl. to handle residual fuel oil and will be ready for operation on April 1.

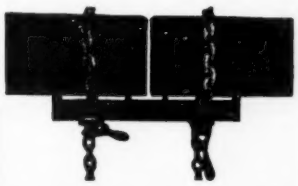
Vanport was selected for the terminal site due to its central location to industrial plants in the Pittsburgh-Youngstown area.

An additional storage plant for other refined products will be built by Great Lakes at a later date, the company announced.

Sherwood Refinery Acquires New Louisiana Facilities

Sherwood Refining Co., Inc., Englewood, N. J., owners and operators of two refineries in Pennsylvania, have acquired the Seaboard Refining Co. refinery on the west bank of the Mississippi River in Gretna, La., for the production of white mineral oil, petrolatum, and petroleum sulfonates. The company also manufactures semi-microcrystalline and high-melting-point waxes, as well as mineral jellies and polybasic perfume compounds.

The company's newest refinery operation in the New Orleans area was selected after a thorough survey of competitive prospective southern



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points. Nearness of raw materials, a central point of manufacture in direct line of haul to eastern, Mid-Continent, and southeastern markets with advantageous economies in transportation added to the decision to establish operations there.

The installation, on 23 acres of land, incorporates 2 and 3-story buildings and storage tanks with total capacity of 4,000,000 gal. It will be placed in operation as soon as renovations and installations of new equipment totaling $500,000 can be completed.

Sherwood's other facilities are located at Warren, Pa., and at Karns City, Pa. Both are devoted chiefly to the manufacture of mineral oil and petrolatum. The Englewood, N. J., plant produces polybasic perfume compounds and mineral jellies.

Oil From Alberta Tar Sands Economical, N.R.C. Reports

OTTAWA.—The National Research Council reports that its scientists have developed a more efficient and economical method of extracting oil from the tar sands of northern Alberta.

The method is to use flash distillation in a fluidized bed of dry sand. The pilot-plant work has confirmed results of experiments previously conducted on a laboratory scale, but the percentage of oil recovery is higher.

The process is not economically feasible, with the present large crude-oil production from Alberta, N.R.C. said, but in the event of war might become valuable.

Improvement of Gasoline by Platforming Is Stressed

Jobbers of Old Dutch Refining Co., meeting in Muskegon, Mich., last week were told of the advantages of increased performance and more economy which are derived from gasoline manufactured by the platforming method.

Harvey W. Blankenship, director of public relations for Universal Oil Products Corp., Chicago, which installed Old Dutch's new platforming unit, urged the men to tell the public of the advantages of platformed gasoline, not only from a performance standpoint, but for the economy resulting.

Blankenship said that the entirely new process for converting inferior straight-run gasoline into motor fuels more readily adapted to requirements of modern engines converts knock-inducing substances so they no longer cause the fuel to knock, and in addition, gum-forming and corrosive materials are removed.

"The process does not provide a simple modification of the undesirable properties of straight-run gasoline, but chemically takes the molecules apart and reassembles them in a combination that is most desirable for motor fuel." he said.

P.G.C.O.A. Marks 20 Years Of Service to Oil Industry

The Pennsylvania Grade Crude Oil Association this month marks the twentieth anniversary of a cooperative petroleum-research program conducted since 1930 under its auspices, with the Pennsylvania oil industry.

The association, a nonprofit group, is composed of Pennsylvania oil producers, refiners, and sellers. It has invested more than $1,000,000 in exploring the best ways to conserve, produce, and refine Pennsylvania Grade crude oil, and to identify motor oils made from it, W. C. Wenzel, executive manager, said.

Wenzel recalled that P.G.C.O.A. voted an appropriation in January 1930 to be used by Pennsylvania State College to develop methods of identifying motor oils made from Pennsylvania Grade crude oil. The continuing program at Penn State, he said, has embraced also studies of the composition of the crude and its relation to product quality, together with investigation and development of refining processes in order efficiently to obtain increased yields of improved products.

The college developed a Pennsylvania oil identification method based on the optical rotary power of certain portions of the lubricating oil, Wenzel said.

The research program was broadened in 1945 when Armour Research Foundation, Chicago, undertook to develop additional methods of identifying Pennsylvania oils.

Correction

In an article on the Port Jerome refinery (*The Oil and Gas Journal, January 5, 1949, page 61*), through an error the refinery was identified as belonging to Cie. Francaise des Petroles. This should have read: "Standard Francaise des Petroles."

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Washington State Test Has Good Show

UNION OIL CO. 3 State, a rank wildcat in 16-18n-2w, Thurston County, Washington, north of the city of Olympia, and near the south end of Puget Sound, has been showing a strong flow of gas and spray of 42°-gravity oil amounting to about 10 bbl. per day, through a 1/32-in. choke on intermittent tests. This show is coming from perforations at two intervals, 3,670-4,400 ft., and 4,663-78 ft.

Due to the few wells drilled in this area, geologists are unable to place the formation from which the show is coming closer than somewhere from Middle Miocene to Oligocene in the Tertiary. It is reported that the section showed stringy, silty sand deposits in a predominantly shale section, and that the zone from which the show is coming is of a similar type.

This is Union's third wildcat in the general area and the thirteenth in the state. So far it has had the best show of any of the tests. Union's first try in this general area was 1 State, located only about 50 ft. north of the present well. It was found dry and was abandoned in 1948.

The 3 State was drilled to a total depth of 9,344 ft., where it ran into a fishing job. After recovery, a string of 7-in. pipe, including 1,632 ft. of 120-mesh perforations, was set at 9,032 ft. Swabbing was then begun, but yielded only water and a little gas. The hole was bridge-plugged at 7,159 ft., and the interval 6,040-6,400 ft. gun perforated. Swabbing again failed to give anything worth while, so the hole was plugged back to 5,070 ft., and the perforations mentioned first above were made.

South of these two tests, Union drilled 1 Bannse in 22-15n-2w, Thurston County, to total depth of 4,330 ft., without finding anything. North of the 3 State, Union and Standard Oil Co. of California are jointly drilling the 1 Hoffert, in 11-22n-1w, in Kitsap County. Last report on this well had it drilling ahead below 4,000 ft.

West of this area, Union has drilled four tests in the past few years. In Grays Harbor County, Union drilled the 1 Weyerhauser in 1-16n-8w to a total depth of 6,608 ft., and the 2 State in 10-18n-12w to a total depth of 3,775 ft. The Weyerhauser is reported to have had a good gas show.

North of these last two tests, Union drilled the 1 Milwaukee Land Co. in Jefferson County, in 27-26n-13w, to a total depth of 5,600 ft., and the 1 Rayonier in 15-28n-13w (Clallam County) to a total depth of 2,350 ft.

From a regional standpoint it is obvious that Union is playing in the sedimentary belt that encircles the Olympic Uplift. Igneous and metamorphic sections indicate the Uplift is a poor place to hope to find oil. But it is noticeable that 1 and 3 State wells, the Bannse and the joint Hoffert test tend to fall in the general neighborhood of the southeast flank of the Olympic Uplift, and not too far north of where a post-Tertiary volcanics area interrupts the southwest and westward swing of the sedimentary section around the Olympic uplift.

From the public record generally available it is not clear what happened in the 1 State, but obviously it is unusual to start a second rank wildcat within 50 ft. of a previous dry hole, in a state so sparsely tested as Washington. It may be a far speculative jump, but with so little of western Washington and Oregon geology being worked out, the outline of the Puget Depression on the U. S. Tectonic Map is bound to cause reflective glances at the Great Valley area to the south in California on the same map. One might even imagine faint resemblances between the area around Bakersfield and the area in Washington being tested.

(References: Department of Conservation and Development, State of Washington; Preliminary Report on Petroleum and Natural Gas in Washington; A.A.P.G., Possible Future Oil Provinces of the United States and Canada; Tectonic Map of the United States.)

Charles J. Deegan

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

SOUTHWEST TEXAS.—In Brooks County, I. K. Howeth et al., completed 2 K. H. Alexander for 61 bbl. of oil daily. F. D. Glass completed 1 F. Zoboroski for 438 bbl. of 33.5°-gravity oil in Zoboroski field of Guadalupe County. On potential, The Texas Co. 1 Duval County Ranch O/A NCT-2, discovery well for "Forty-Nine" field, pumped 20 bbl. of 21.3°-gravity oil through perforations from 1,574-86 ft. It is reported that William Hamm, Jr.'s, "tight" wildcat, 1 Myra L. Duboise, Jim Wells County, was completed as a discovery, but no details are known at present.

WEST TEXAS.—Five Kent County wildcats, all projected to the Ellenburger, were in the planning or location stage this week. Immediate exploratory work was to get under way, covering several thousand acres north and east of the Cogdell discovery. In Scurry County, Gene Goff 1 Rylander, 124-2-H&GN, 5 miles south of Sunray 1 Sentell, flowed an estimated 30 bbl. of oil in 90 minutes following acid treatment of the Strawn in open hole from 7,170-93 ft. Turned into storage, it gaged 14 bbl. hourly through 1/8-in. choke for 6 hours.

SOUTHEAST NEW MEXICO.—Humble Oil & Refining Co. 1 Federal-Wiggs, Eddy County wildcat in 31-24s-27e, 16 miles south of Carlsbad, was preparing to core ahead at 14,646 ft., said to be a record depth for the state.

ROCKY MOUNTAIN AREA.—Continental Oil Co. has completed its first Wall Creek sand producing well in the Sussex area, Wyoming, flowing 144 bbl. of oil daily. Mountain Fuel Supply Co. is drilling below 14,587 ft. at the Nugget test at Church Buttes, Wyoming.

ROCKY MOUNTAIN

Fourth Pay Zone For Sussex Area

DENVER.—Development drilling in the Sussex area, Johnson County, Wyoming, has proven some interesting sub-surface conditions in this area since the first Lakota sand discovery well was completed in the area in 1948. Continental Oil Co., operator of the 13,376-acre unit, this week completed its first Wall Creek sand producing well in the field. The well is 10 Unit, SE NE SW 23-42n-78w, a south extension to the East Sussex producing area. It was drilled to 7,610 ft. total depth, in Morrison and tested water in Lakota, the zone productive in other wells in this area. Continental plugged the well back to Wall Creek and perforated casing at 6,375-6,409 ft. Following a 3,000-gal. acid treatment the well flowed 6 bbl. of 40.5°-gravity oil per hour and was completed with an estimated flowing potential of 144 bbl. daily. This is the fourth productive zone established in this field. In the Sussex pool proper production is from the Shannon and Lakota sands, at East Sussex in the Wall Creek and Lakota and recently at South Sussex, Delhi Oil Corp. of Dallas established production from the Sussex sand, a stray sand above the Shannon. Continental now has five rigs running in this area, with one drilling a wildcat in the Meadow Creek area, south of South Sussex and 6 miles south of the Sussex discovery well. Delhi and American Liberty Oil Co., who have joint operations in this area, have one drilling well and plan another immediately in the South Sussex area. These pools are along the west central side of the Powder River Basin, north of the Salt Creek field. Oil accumulation in the area is apparently at least partially controlled by major faulting along the rim of the Basin.

Mountain Fuel Supply Co. has released no data on its first well below the Morrison in the Church Buttes field, Uinta and Sweetwater counties, Wyoming. The well is 7 Unit, C SW NW 17-16n-112w, and is now reported coring below 14,587 ft. At this depth the well is believed to be in Nugget sands, the principal objective of the well, and there is no report of shows in that formation. It is reported, but not confirmed, that formations below the Morrison have been hard and tight. Discovery of gas in the Dakota formation at around 12,500 ft. was made at Church Buttes by Mountain Fuel in 1946 and the company now has six wells completed in that formation.

Carter Oil Co. tested water in the Dakota at is northeastern Colorado wildcat at 1 Blanchard, C SE NE 11-6n-55w, in the Fort Morgan area, Morgan County. Dakota sand was topped at around 5,236 ft. and on drill-stem test at 5,240-5,319 ft. the well made 673 ft. of brackish water and 60 ft. of mud in 30 minutes. The operator is now drilling below 5,340 ft. and will test Lakota prior to completing the wildcat. Dakota was considered the most likely producing formation in the test, which is located on a block approximately 30 miles south of Ohio Oil Co.'s Gurley pool, Cheyenne County, Nebraska.

WILDCAT SUCCESSES IN WYOMING

Glenrock area, Converse County: Steelco Drilling Co. 1 McDonald, SW NE SE 32-34n-75w; 5½-in. csg. at 7,258; Mesa Verde 1,945, Parkman 2,380, Steel 2,848, Niobrara 5,490, Frontier 6,125, Muddy 7,202-26; perf. 7,202-7,226 with 176 holes; flowed average 21 bbl. oil per hour on 17-hour test through ¼-in. choke; 7,258 TD.

Sussex area, Johnson County: Delhi Oil Corp. 1 Govt., SE NW NE 35-42n-78w, Sussex sand 3,923, Shannon 4,439; flowed estimated 400 bbl. oil per day through 7 64-in. choke, TP 80 psi., CP 110 psi.; 4,513 TD.

WILDCAT FAILURES IN WYOMING

Little Missouri River, Crook County—L. A. Bergman 1 Govt., NW NW NW 15-57n-65w, 1,765 TD; suspended.

North Alkali Butte, Fremont County: Stanolind Oil & Gas Co. 1 Shoshone Arapahoe Tribal "C," SW SW SE 1-1s-5e (WRM), Ft. Union 1,365, Lance 3,320, Mesa Verde 4,480, 6,418 TD; plugged and abnd.

Skelton Dome, Hot Springs County: Continental Oil Co. 1 Skelton Unit, NE NW NW 26-45n-100w, Frontier 2,155, Mowry 2,688, Muddy 3,297, Cloverly 3,467, Morrison 3,808, Sundance 3,955, Gypsum Springs 4,317, Chugwater 4,378, Dinwoody 5,505, Phosphoria 5,583, Tensleep 5,779, Amsden 6,117 (?), Basal Amsden 6,310, Madison 6,360; 6,579 TD; abnd.

West Alcova, Natrona County: West Alcova Oil Co. 1 Govt., NW SW NE 15-30n-84w; 1,028 TD; suspended.

NW Deaver area, Park County: Kirk Oil Co. 1 White, SW NW NE 25-57n-98w, Frontier 1,600, Peay 1,931; 1,969 TD; abnd.

WILDCAT FAILURES IN COLORADO

Loveland area, Larimer County: Charles S. Lavington 2 Trindle, C SE¼ 30-5n-68w; top Basal Hygiene 1,787; abnd.; 1,811 TD.

Horesefly Peak, Ouray County: Kelly Young et al 1 Hull Bros., SE NE SE 31-46n-9w; 2,021 TD; suspended.

Buford Anticline, Rio Blanco County: Siegel & Aimonetto-Phillips 1 Steele, SW SW SW 25-1n-91w; Madison 3,511; abnd.; 2,064 TD.

WILDCAT FAILURES IN MONTANA

Reservoir Coulee, Blaine County: B & R Gas & Oil 1 Lohman, NE NE SE 32-34n-18e; Virgelle 680; 809 TD; suspended.

C. R. Bronson 1 Blevins, CW½ NW NE 29-34n-18e; Eagle 812; 1,556 TD; suspended.

WILDCAT FAILURES IN UTAH

Myton, Duchesne County: E. S. Rich et al 2 State, C 36-8s-16e; Green River 2,267; 2,267 TD; suspended indefinitely.

Crescent area, Grand County: Crescent Junction Expl. Co. 1 Reader, C SW SE 4-22s-19e; OWDD; OTD 6,150; 10,351 TD; abnd.

Strawberry Unit, Wasatch County: Carter Oil Co. 1 H. C. Duhrkop, NW NW SE 33-4s-11w; started and completed in Green River; 2,758 TD; abnd.

SOUTH DAKOTA WILDCAT FAILURE

Butte County: Wm. Seyler 1 Anderson, 12-8n-5e, dry, TD below 5,700 ft., tight hole.

WILDCAT FAILURE IN NEBRASKA

Southeast Chappell, Deuel County: Cope Associates 1 Schwartz, C NE NW 32-13n-44w; Niobrara 2,710, Codell 3,135, Greenhorn 3,297, Dakota 3,506, Fuson 3,700, Lakota 3,795, Morrison 4,010, Red Beds 4,290; 4,316 TD; abnd.

MISSISSIPPI

Humble Getting Two Hits to Start Year

JACKSON.—Humble Oil & Refining Co. is preparing to complete Mississippi's first oil discovery for 1950, the D-1 Mrs. C. L. S. McKittrick, 50-7n-3w, approximately ½ mile south of the city limits of Natchez, Adams County. After treating perforations at 10,300-20 ft. with 750 gal. of acid, a drill-stem test was run, and on 14-hour test the well flowed at the rate of 125 bbl. of 26.8°-gravity oil per day. The well was swabbed down 2,000 ft. below surface at which time it started flowing by heads and flowed 6 bbl. of oil plus 12 per cent wash water and then died. Flowing by heads the well made 60 bbl. of oil in 24 hours on ⅛-in. choke with tubing pressure ranging from 0 to 100 psi. Further tests are to be made before initial potential is taken. Operators have released no information on a 9-ft. Wilcox sand reported logged at 4,430 ft.

Also in Adams County, 9 miles south of Natchez, Humble is in the process of installing pumping equipment at the 1 Mrs. Roane F. Byrnes, after unsuccessful attemps to complete as a flowing well. After running tubing the well was swabbed down to 6,000 ft. with recovery being wash water and oil. After being shut in over night the fluid rose 3,500 ft. or to 2,500 ft. below surface. The well was then swabbed for 12 hours with recovery being oil and some salt water. It was again shut in over night and then swabbed. Flow was 18 bbl. of oil plus 2 per cent water and then died. Earlier, the well had flowed at the rate of 120 bbl. of 27°-gravity oil daily on drill-stem test.

In the Pickens field area, Yazoo County, The Carter Oil Co. is conditioning mud to run Schlumberger log to total depth of 12,250 ft. The Smackover wildcat has been cored almost continuously from 11,100 ft. to the present depth. Shows of both oil and gas have been logged in many of the cores but the formation has been nonporous. Unconfirmed reports are that the test may

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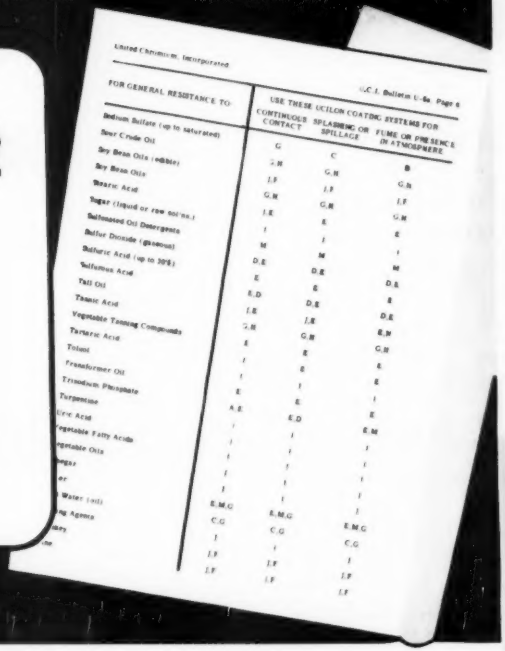
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U.C.I. Bulletin U-8a Page 6

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Soy Bean Oils	G,H	G,H	G,H
Stearic Acid	I,E	E	E
Sugar (liquid or raw sol'ns.)	I	I	I
Sulfonated Oil Detergents	M	M	M
Sulfur Dioxide (gaseous)	D,E	D,E	D,E
Sulfuric Acid (up to 30%)	E	E	E
Sulfurous Acid	E,D	D,E	D,E
Tall Oil	I,E	I,E	E,M
Tannic Acid	G,H	G,H	G,H
Vegetable Tanning Compounds	E	E	E
Tartaric Acid	I	I	I
Toluol	I	I	I
Transformer Oil	E	E	E
Trisodium Phosphate	A,E	E,D	E,M
Turpentine	I	I	I
Uric Acid	I	I	I
Vegetable Fatty Acids	I	I	I
Vegetable Oils	I	I	I
Vinegar	I	I	I
Water	E,M,G	E,M,G	E,M,G
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be drilled to 13,000 ft. Original contract depth was 11,500 ft. To date, no Smackover lime production has been found in Mississippi.

MISSISSIPPI WILDCAT FAILURE

Itawamba County: C. A. Hillman 1 J. E. Kennedy, 15-11s-9E, dry, TD 247 ft.

LA.-ARK.

Claiborne Parish Test Looks Promising

SHREVEPORT.—Ohio Oil Co. and Gulf Refining Co. 1 O. L. Martin, Claiborne Parish wildcat in 3-22n-7w, drilled to 11,757 ft. in salt and plugged back to 9,136 ft., continued testing.

Following 140 jet shots in casing at 9,035-70 ft., identified as the Stray sand of the Cotton Valley, operators ran tubing without packer but the well would not flow. When swab was run, fluid level was found at 1,200 ft., and after one trip of the swab the well starting heading an estimated 20-25 bbl. of fluid an hour, of which 75 per cent was oil and the balance drilling mud. It was shut in to build up pressure. In 12 hours tubing pressure was 1,000 psi.

In Caddo Parish, Bert Fields and The Texas Co. 1 Thigpen-Herold, 23-16n-16w, was drilling below 6,195 ft. Electrical survey was to be run at 6,250 ft. Cores from 6,052-97 ft. recovered 45 ft. of shale and lime, with faint gas odor in spots. From 6,110-52 ft., and 6,162-81 ft. recovery was shale and lime with no shows. Sample tops on the Sligo and Travis Peak were 5,705 and 6,050 ft., on elevation of 264 ft.

In LaSalle Parish, Arkansas Fuel Oil Co. A-20 Tremont Lumber Co., 33-10n-2e, was drilling below 5,601 ft. in chalk.

Placid Oil Co. 127 Louisiana Central Lumber Co., 24-11n-3e, was drilling below 6,257 ft. after cutting 25 sidewall cores in the Wilcox topped at 1,690 ft.

H. B. Brown 2 J. K. Mahoney, 44-17n-13e, Madison Parish, was drilling at 4,004 ft.

G. M. LeGrand 1 J. F. Yearwood, 7-14n-11w, was waiting on cement at 938 ft., total depth.

Brooks 1 Nelson, 29-23n-3w, Union Parish, was heading every 6 to 8 minutes, making 129 bbl. of oil on a 24-hour gage, through ½ and ¾-in. chokes, from perforations at 9,320-26 ft. Flowing tubing pressure was 100-110 psi. while heading. Operators thought the yield was representative of the well's potential.

Arkansas wildcat activity included the following: Ormond Corp. 1 B. F. Lawler, 29-14s-18w, Ouachita County, drilling below 480 ft. Elevation is 200 ft.

In Union County, C. H. Murphy & Co. 1 W. K. Gregory, SE SW 28-19s-18w, was drilling below 8,852 ft. Cores from 8,602-11 ft. recovered 1 ft. 8-in. of sand and shale with faint odor, and 3 ft. 3-in. of tight sand. C. H. Murphy 1 Pepper, SE NE 32-18s-15w, was coring below 6,834 ft. Recovery from 6,612-23 ft. contained 3 ft. of sand with oil show.

NORTH LOUISIANA WILDCAT FAILURES

Bienville Parjsh: Arkansas-Louisiana Gas Co. 1 Annie Lou Jones, SW SW NE 20-18n-6w, dry, TD 7,026 ft., elev. 257 ft., Saratoga 2,354 ft., base Annona 2,651 ft., Tuscaloosa 3,670 ft., lower Cretaceous 3,857 ft., Massive sand 5,193-5,475 ft., Rodessa 5,643 ft., Pettit 6,675 ft., Travis Peak 7,024 ft.

Concordia Parish: McDaniel Bros. 1 B. C. Crothers, SW SW 27-9n-8e, dry, TD 9,224 ft. in lower Cretaceous, elev. 72 ft., Talahata 3,260 ft., Wilcox 3,364 ft., Clayton 6,906 ft., Cretaceous 7,000 ft., Eagleford 8,272 ft., Tuscaloosa 8,422 ft., Massive 9,135-73 ft., Fredericksburg 9,205 ft.

Winn Parish: The Texas Co. 1-A Urania Lumber Co., 1,250 ft. S and 500 ft. E of NWc, 17-11n-1e, dry, TD 7,031 ft., elev. 161 ft., Wilcox 1,364 ft., Midway 3,368 ft., Arkadelphia 4,035 ft.

ARKANSAS WILDCAT FAILURES

Hempstead County: J. H. Buchanan 1 H. Earl King, SW SE NE 28-10s-25w, dry, TD 2,511 ft.

Lafayette County: McAllester Fuel Co. 1-A Bodcaw, NW NE 11-15s-25w, dry, TD 6,708 ft., elev. 326 ft., Nacatoch 1,130 ft., Saratoga 1,502 ft., base annona 1,850 ft., Tokio 2,155 ft., Paluxy 2,615 ft., Glen Rose 3,213 ft., Massive anhydrite 3,433-3,558 ft., James 4,010 ft., Travis Peak 4,308 ft., Cotton Valley 5,160 ft., Buckner 6,475 ft., Smackover 6,696 ft.

Miller County: B. P. Seay 1 G. E. Cox, SW NW NW 31-14s-27w, dry, TD 3,420 ft., elev. 268 ft., Nacatoch 515 ft., base Annona 1,347 ft., Massive anhydrite 3,294-3,394 ft., Kilpatrick 3,396 ft.

EASTERN TEXAS

Grayson County Gets First Ellenburger Oil

DALLAS.—The first Ellenburger producer for Grayson County was completed this week by The Texas Co. at its 1 John Marshall, A. Tuttle Survey, 2½ miles south of Sandusky in the northwestern corner of the county.

On completion test the well flowed 105½ bbl. of 44.5°-gravity oil in 24 hours, through 12 64-in. choke, under 200 psi. pressure on tubing, from pay at 7,860-66 ft. Total depth was 7,885 ft., with casing cemented at 7,848 ft. Gas-oil ratio was 213 cu. ft.

The company is said to hold some 2,000 acres of leases under the wildcat, which were detailed with seismograph before making location. Additional seismic exploration was planned before making location for the second and confirmation well.

Hollandsworth Oil Co., Longview, staked location for a second test on the George Schenewerk land 5 miles southeast of Pine Mills townsite in Wood County. The new site is on a 104-acre tract in the William Fisher Survey, and 1,600 ft. south and slightly west of the company's 1 Schenewerk.

Meanwhile, Hollandsworth's first well, a Woodbine prospect, had changed swabbing units in an effort to improve production. It kicked off and flowed last week, from perforations at 5,475-90 ft., making 4 bbl. of oil an hour through 13 64-in. choke. After cleaning itself, swabbing was resumed.

In Pine Mills field, F. R. Jackson and associates 1 C. B. Kennedy Heirs, David Gilleland Survey, located 730 ft. of the same operators' 1 Durrett, discovery in the sub-Clarksville, prepared to perforate and test Woodbine shows after finding salt water in the sub-Clarksville section. Total depth on the 1 Kennedy was 6,114 ft., with casing set to around 5,650 ft. Further details were not released. Sohio Petroleum Co. 1 G. T. Turner, confirmation well for the field and a north offset to the discovery, reported good shows in the Woodbine, but did not test.

EAST TEXAS (DISTRICTS 5, 6 AND 6-P) WILDCAT FAILURES

Collin County: O. W. Killam 1 Harrington, G. A. Wilson Sur., 2 mi. NW Weston, dry, TD 6,156 ft., elev. 734 ft.

Nacogdoches County: Humble Oil & Refining Co. 21 Mary R. Saner, Charles Holmes Sur., A-264, 4 mi. NE Trawick, dry, TD 8,253 ft. in Travis Peak; sample tops: Goodland 4,720-30 ft., Trinity 4,930-40 ft., upper Glen Rose 5,160-70 ft., Massive anhydrite 6,700 ft., base James and top Pettit 7,555 ft.

Navarro County: Coffield & Guthrie, Inc., 1 Lynn Adams, Marrhew Boren Sur., 3 mi. E Currie, dry, TD 3,067 ft., Woodbine sand 3,063-67 ft.

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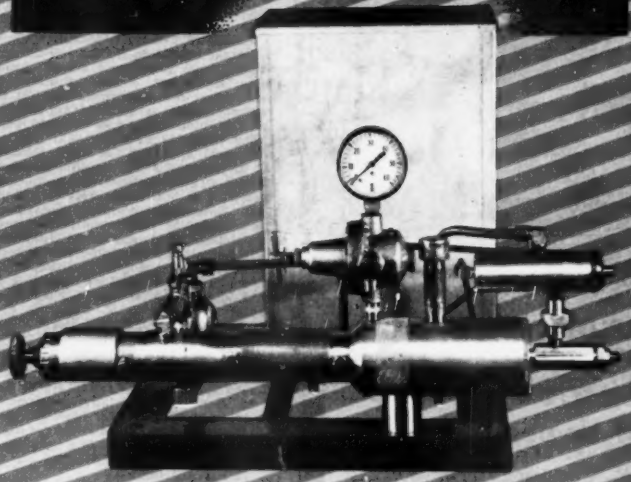

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N. CENTRAL TEXAS

Jack County Reports Continued High Activity

WICHITA FALLS.—Jack County operations have continued at a great pace, with some 30 active rigs reported, in an unusually slack period.

Five miles north of Jacksboro, L. M. Lockhart and G. C. Glasscock 1 Worthington, SP Survey, A-575, topped conglomerate at 5,321 ft., drilled to 5,333 ft., and ran a 15-minute drill-stem test. Gas showed in 1 minute and recovery was 30 ft. of distillate.

A second conglomerate was topped at 5,378 ft. and drilled to 5,410 ft., A 30-minute test of this section had gas in 19 minutes and recovered 1,030 ft. of oil, plus a small amount of salty mud. Operators were running casing for production tests.

Five miles east of Jermyn, Trinity Production Co. 1 J. B. Clay "A," wildcat in Block 2, W. J. Cooke Survey, A-2186, topped the upper Caddo at 4,483 ft., and the lower Caddo at 4,901 ft. A drill-stem test from 4,903-15 ft. showed gas in 9 minutes. In 1 hour, recovery was 280 ft. of oil-cut mud, plus 40 ft. of salt water. Flowing pressure was 250 psi., and shut-in pressure 2,075 psi. Operators were to set casing.

Daniel Oil Co. 1 O. C. Brown, wildcat in the W. Brummett Survey, A-111, 12 miles southeast of Jacksboro, drilled plug from 5-in. casing set at 4,544 ft., and on preliminary tests was showing some 7,500,000 cu. ft. of gas a day from the conglomerate at 4,545-65 ft.

In the northwestern part of the county, 2 miles southwest of Shannon, Warren Oil Corp. 1 Cable-Smith, Lot H, M. Putnam Survey, was drilling lime and shale below 4,494 ft. It is contrcated to 6,600 ft.

Herman Price 1 Minton, Lot 25, League 1, Henderson County School Land, southeastern area test 1 mile north of Gibtown, had casing set on bottom at 4,368 ft., which was said to be in the Caddo. Official information had not been released. Drilling was to be resumed with cable tools.

Wise County.—A. R. Dillard and others 1 J. B. Smith, Section 1, Falls County School Lands, A-293, wildcat test 1¾ miles southwest of Park Springs, recovered 67 ft. of heavily oil-cut and slightly gas-cut mud on a 1-hour test of the Caddo lime from 5,525-54 ft. It drilled ahead below 5,555 ft. following the test.

Cities Service Oil Co. 1 S. Williamson, wildcat in Block 4, Falls CSL, A-988, 5 miles northwest of Alvord, was drilling below 5,052 ft.

One mile north of Cottondale, Akin & Dimock 1 J. I. Gentry, Block 83, Matagorda CSL, A-534, perforated with two shots per foot in conglomerate section from 5,307-24 ft., ran the swab twice, then flowed an estimated 5,000,000 cu. ft. of gas daily, plus an unestimated amount of distillate.

Montague County.—Magnolia Petroleum Co. staked location for its 1 Quillen Estate, 380 ft. from north and 600 ft. from west lines, Block 192, Belcher Survey. It is a west offset for a confirmation test in Carminati (Strawn sand) field, 4½ miles northwest of Montague, opened last year. Proposed depth is 5,800 ft.

General American Oil Co. 1 Hinds Clark, W. D. Redd Survey, southwest stepout to Eanes (Bend conglomerate) field, reported a flow of 44 bbl. of 48°-gravity oil, through ¼-in. choke, for an unspecified time, from pay at 5,910-59 ft. Two miles southwest of the field, The Texas Co. 1 Anna McFall, J. B. McFall & J. B. Robertson Survey, was drilling below 5,280 ft. in shale.

Two miles northeast of Rogers & Rogers field and 1 mile north of Nocona, Continental Oil Co. 1 L. Z. Cone, E. F. Stanberry Survey, A-679, was dry at 5,785 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 7-B) SUCCESSFUL WILDCATS

Taylor County, new field: J. W. Gehle 1 S. H. Curry, J. E. Shepard Sur., 96, 3½ mi. SW Abilene, TD 4,095 ft., elevation 1,943 ft., shot Gardner sand 4,083-95 ft., IP flowed 121 bbl. 39.6°-gravity oil a day, ⅛-in. choke, GOR 387 cu. ft., TP 75 psi., CP 680 psi.

Throckmorton County, new field: Wm. Hamm, Jr., 1 Bessie Rhodes, Sec. 302, BBB&C Sur., 3¾ mi. N Throckmorton, TD 4,798 ft., elevation 1,297 ft., top Mississippian 4,778 ft., pay 4,782 ft., set 5-in. to 4,782 ft., IP flowed 201 bbl. 41°-gravity oil a day, 16 64-in. choke, GOR 450 cu. ft., TP 760 psi., CP 860 psi.; Caddo topped 4,336 ft. had 32 ft. of pay.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: P. P. Langford, Jr., and E. F. Barton 1-A L. F. Wilson Estate, Blk. 115, ATNC Subd., 6 mi. NW Archer City, dry, TD 1,446 ft. in sand, oil show 1,444-46 ft.

Frank Wood 1 J. M. Powell, Blk. 119, J. W. Harris Subd. Club Ranch, 2½ mi. NW Archer City, dry, TD 4,010 ft.

Brown County: Scott L. Taliaferro 1 G. T. Butler, D. E. Holloway Sur., 6 mi. NE Cross Cut, dry, TD 1,294 ft., elevation 1,672 ft.

Callahan County: C. W. Scott 1 G. A. Crane, 9-6-SPRR, 7 mi. NW Oplin, dry, TD 4,728 ft., PB 1,900 ft., elevation 1,984 ft., Sedwick 1,300 ft., Ranger 2,645 ft., Winchill 2,728 ft., Palo Pinto 3,165 ft., Caddo 4,160 ft., Ellenburger 4,668 ft.

Cooke County: T. B. Cochran 1 J. W. Coker, E. Ball Sur., A-60, 3 mi. NW Bulcher, dry, TD 2,455 ft., elevation 876 ft.

Coryell County: Amerada Petroleum Corp. 1 Tillie May Perkins, M. Ramirez Sur., 4 mi. SW Slater, dry, TD 2,570 ft., elevation 1,098 ft.

Fisher County: H. C. Spoor, Jr., 1 L. L.

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Stuart, 201-3-H&TC, 9 mi. SW Roby, dry, TD 6,206 ft., elevation 2,055 ft., Valera 2,623 ft., Dotham 3,540 ft., Canyon 4,150 ft., reef 6,012 ft.

Hamilton County: Amerada Petroleum Corp. 1 L. S. Burney, Alfred Grimes Sur., 4½ mi. E Spurlin, dry, TD 5,238 ft., elevation 1,204 ft., Ellenburger 4,070 ft.

Haskell County: Bridwell Oil Co. 1 Hendrick Estate, Sec. 103, Indianola RR Sur., A-297, SE corner of county, dry, TD 3,230 ft., elevation 1,636 ft., Palo Pinto 3,205 ft.

Jones County: Bridwell Oil Co. 1 Chas. Anderson, Sec. 27, HT&B Sur., 2½ mi. N Leuders, dry, TD 2,173 ft., elevation 1,585 ft.

Forrest H. Lindsay 1 F. W. Poe, Lot 11, League 335, L. Kratz Sur., 9 mi. W Anson, dry, TD 3,295 ft., elevation 1,840 ft., Swastika 3,255 ft.

Taubert Drilling Co. 1 R. G. Rowell, Sec. 20, Orphan Asylum Lands Sur., 7 mi. E Anson, dry, TD 3,552 ft., elevation 1,674 ft., coal 2,057 ft., Flippen 2,070 ft., Hope 2,225 ft., Gunsight 2,355 ft., King 2,380 ft., Swastika 2,475 ft., Reef 2,990 ft.

Montague County: Continental Oil Co. 1 L. Z. Cone, E. F. Stanberry Sur., A-679, 1 mi. N Nocona, dry, TD 5,785 ft.

Shackelford County: C. J. Myers 1 Estelle Flippen, 41-11-T&P, 5 mi. S Albany, dry, TD 1,053 ft.

Stephens County: McElroy Ranch Co. 1-B L. P. Martin, Sec. 1514, TE&L Sur., 9 mi. W Breckenridge, dry, TD 4,520 ft., elevation 1,219 ft., Caddo 3,471 ft., Ellenburger 4,425 ft.

Taylor County: Geophysical Surveys, Inc., 1 H. H. Ramsey, Sec. 80, T. D. Johnson Sur., 4½ mi. NE Abilene, dry, TD 2,055 ft., elevation 1,680 ft., Dotham 2,970 ft.

Throckmorton County: Fred M. Manning, Inc., 1-X S. R. Davis, G. Alford Sur., A-2, 4 mi. E. Throckmorton, dry, TD 4,725 ft.

APPALACHIAN FIELD

Wood County, W. Va., Test Getting Big Gas Flow

PITTSBURGH—In Steele District, Wood County, West Virginia, Godfrey L. Cabot, Inc., No. 1301 Thomas P. Beard, a wildcat, is showing for 25,000,000 cu. ft. of gas in the Oriskany sand, which was topped at 5,360 ft. At this rate it is the largest well in the field at this date. In the Clay District, Hancock County, John T. Galey, No. 1 Karol and Catherine Sobel struck gas in this formation at 4,756 ft. testing 1,470,000 cu. ft. Drilling is continuing and is at a depth of 4,772 ft. In Portland District, Preston County, Snee & Eberly, No. 2 Cora E. Lewis, elevation 1,953 ft., is drilling at 5,141 ft.

Nine new locations were reported in West Virginia: Sherman District, Calhoun County; Union District, Jackson County; Harts Creek District, Lincoln County; Chapmanville and Triadelphia districts, Logan County; Buffalo and Curry districts, Putnam County; Harper District, Roane County; and Union District, Wayne County.

In Buffalo Township, Butler County, Pennsylvania, T. W. Phillips Gas & Oil Co. shallow well No. 1 J. D. Easly farm, resulted in gas gaging approximately 7,500,000 cu. ft. in the Fifth sand after tubing, total depth 2,033 ft. Wharton Township, Fayette County, William E. Snee et al, No. 3 Indian Creek Coal & Coke Co., elevation 2,615 ft., had a small show of gas in the Chert at 7,193-7,194 ft. The top of this formation was at 7,012 ft. Napier Township, Bedford County, South Penn et al-Snee & Eberly, No. 1 Jesse B. Miller, elevation 1,666 ft., is drilling at 5,780 ft.

One new location was reported in Southwest Pennsylvania, in Allegheny Township, Westmoreland County.

Two wells are under way in Garrett

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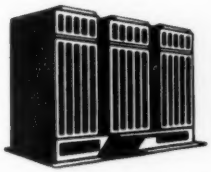

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County, Maryland: Eberly and Snee, No. 1 George H. Blocker drilling at 1,590 ft., and Fox & Trimble moving rig to No. 1 Edward Kite.

SOUTH LOUISIANA

Good Discovery for Plaquemines Parish

NEW ORLEANS.—A good oil discovery in the North Main Pass area of Plaquemines Parish has been completed by The California Co. The 1 North Main Pass Unit reported an initial flow of 350 bbl. of 32.9°-gravity oil per day through a 9/64-in. choke, with 1,525 psi. flowing pressures on the tubing. Hole is bottomed at 9,813 ft. and is producing through perforations at 9,026-47 ft. Operators logged an oil sand from 6,435-67 ft. and two gas sands, one from 7,705-59 ft. and the other from 8,685-725 ft. Location of the discovery is in Section 22-20s-19e, southeast of the Grand Bay field and northwest of the company's offshore Block 69 Main Pass field.

Magnolia Petroleum Co.'s second test on the 1 Rabley Lumber Co., 20-5s-7w, a prospective discovery approximately 8 miles east of Longville, Beauregard Parish, hit a flow of 100 per cent salt water. Test was made through perforations at 8,844-49 ft. The first test through perforations at 8,876-83 ft. made approximately 100 bbl. of fluid per day, being 30 per cent oil and 70 per cent water. Operators are now coming up the hole, which is totaled at 9,000 ft., and are preparing to test another zone at 8,256-62 ft.

The Ohio Oil Co. continues to drill in the 1 E. W. Brown, Jr., Calcasieu Parish wildcat, after encountering a slight oil show at 5,587 ft. Hole is projected to 11,000 ft. and operators are now drilling below 7,800 ft. The prospective discovery is in the southwest corner of Section 20-11s-13w, 5 miles northwest of Black Bayou and 6½ miles southwest of Vinton production.

Welsh production has been extended a northeasterly direction with completion of the Stanolind Oil & Gas Co. 1-A Ervine & Bishop, in Jeff Davis Parish. The well flowed 178 bbl. of 41.2°-gravity oil daily through 6 64-in. choke with 1,050 psi. tubing pressure. Hole it totaled at 6,800 ft. and is producing through perforations at 6,713-18 ft.

Gulf Refining Co. has logged sands of a restrictive nature in the 1 Provost-Cyr Unit, Weeks Island area wildcat, Iberia Parish. Seven-inch string was cemented at 13,200 ft., and operators are now waiting on cement. Sand was logged from 12,435-70 ft. and a broken section logged from 12,-516-50 ft. and 12,633-97 ft. Location of the venture is approximately 1¼ miles southeast of Shell's deep production on the northeast flank and 1¾ miles northeast of Humble's production on the southeast flank.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Assumption Parish: New pay and extension to Napoleonville field—Floyd L. Karsten 1 Gus J. Labarrow, 47-12s-13e, top pay 6,040 ft., perf. 6,040-60 ft., TD 6,202 ft., IP: shut-in gaser.

Iberia Parish: Gas condensate discovery—Humble Oil & Refining Co. 1 State Lse. 1,706-W, Cote Blanche Bay, Lake sand area, top pay 1,005 ft., TD 13,050 ft., perf. 10,005-10 ft., IP: 36 bbl. condensate and 5,047 M.c.f. gas per day, ¼-in. choke, GOR 142,000, TP 3,400 psi.

SOUTH LOUISIANA WILDCAT FAILURES

St. Landry Parish: Bates & Cornell 1 George Burleigh, 23-7s-3e, 1¾ mi. W of Shuteston production, dry, TD 10,450 ft.

Terrebonne Parish: Bay Petroleum Corp. 1 South Coast Corp., 17-17s-17e, 5 mi. S of Houma production, dry, TD 11,013 ft.

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DESCRIPTION	STANDARD WEIGHT	EXTRA STRONG	SCHEDULE 160	DOUBLE EXTRA STRONG	LIGHT GAUGE NOMINAL PIPE SIZE	LIGHT GAUGE IRON PIPE SIZE
ELBOWS—90° Long Radius	½"-24"	½"-24"	1"-12"	½"-8"	4"-24"	½"-12"
ELBOWS—90° Short Radius	1"-30"	2½"-30"				
ELBOWS—45° Long Radius	½"-30"	½"-30"	1"-12"	½"-8"	4"-24"	½"-12"
RETURNS—180° Long Radius	½"-24"	½"-24"	1"-12"	2"-8"	4"-24"	½"-12"
RETURNS—180° Short Radius	1"-30"	2½"-30"				
RETURNS—180° Extra Long Radius	1"-21½"	1"-21½"				
TEES—Straight	½"-24"	½"-24"	½"-12"	½"-8"		
TEES—Reducing Outlet	½"-24"	½"-24"	¾"-12"	½"-8"		
REDUCERS—Concentric and Eccentric	½"x½" 24"x 20"	¾"x½" 24"x 20"	¾"x½" 12"x 10"	¾"x½" 8"x 6"		
CAPS	½"-24"	½"-24"	1"-12"	1"-8"		
STUB ENDS—Lap Joint	½"-24"	½"-24"				
SADDLES	1"-24"**					
LATERALS—Straight	1"-24"	1"-24"				
LATERALS—Reducing on run	1"-24"	1"-24"				
CROSSES—Straight and Reducing	½"-24"	½"-24"				
RINGS—Welding, Grove Type	½"-24"	1"-24"		1½"-8"		
RINGS—Welding, Ridge Type	½"-12"	½"-12"				
SLEEVES—Welding	2"-24"**					

** Since saddles and sleeves are for external reinforcement only, they do not conform to iron pipe size thicknesses.

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DESCRIPTION	150 LB.	300 LB.	400 LB.	600 LB.	900 LB.	1500 LB.	2500 LB.
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SLIP-ON	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-12"
LAP JOINT	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-12"
THREADED	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-12"	½"-12"
BLIND	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-12"
SOCKET TYPE	¼"-24"	¼"-4"	¼"-3½"†	¼"-3½"			
REDUCING—Threaded or Slip-On	¼"-24"	¼"-24"	¼"-24"†	¼"-24"	¼"-24"*	¼"-12"	¼"-12"
ORIFICE—Threaded		1"-24"	4"-12"	4"-12"	3"-12"	1"-12"	
ORIFICE—Slip On		1"-24"					
ORIFICE—Welding Neck		1"-24"	4"-12"	1"-12"	3"-12"	1"-12"	

† Dimensions on sizes thru 3½" same as for 600 lb. flanges.
* Dimensions on sizes thru 2½" same as for 1500 lb. flanges.

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SOUTHWEST TEXAS

Good Shallow Strike In Guadalupe County

CORPUS CHRISTI.—F. D. Glass has completed the 1 Frank Zoboroski for a discovery in the Zoboroski (Old) field of Guadalupe County. The hole was drilled to a depth of 2,415 ft. and operators ran 7-in. production casing to 2,374 ft. and before it could be cemented, the well blew out. It was controlled, and completion was made through open hole from 2,374-415 ft. for 438 bbl. of 33.5° -gravity oil daily. The pay was topped at 2,395 ft. The new discovery is located in the Joseph D. Clements Survey 14.

Three miles southeast of Sejita in Brooks County, I. K. Howeth et al have completed the 2 Kathleen Hocker Alexander for an oil discovery. The hole was drilled to a depth of 4,816 ft. and 5½-in. production string was set on bottom. The well flowed 61 bbl. of pipe-line oil per day with no water through a ¾-in. choke with 60 psi. tubing pressure, casing sealed.

The Texas Co. has run a potential test on the 1 Duval County Ranch O A NCT-2, oil discovery 7½ miles southwest of Freer and 1 mile north of the Colmena field in Duval County. The new field has been named "Forty-Nine." The well was bottomed at 2,622 ft. and plugged back to 1,586 ft. for completion attempt. Through perforations from 1,574-86 ft., the well pumped 20 bbl. of 21.3-gravity oil per day. Pay was topped at 1,574 ft. The new discovery is in the GB&CNG RR Survey 49, Abstract 715.

It is reported that William Hamm, Jr., has completed the 1 Myra L. Duboise, Jim Wells County wildcat, for an oil discovery and is now building storage. The well has been drilled "tight" and no details are known at present. It is located in the J. G. de la Garza Montemay Survey, Abstract 296.

Humble Oil & Refining Co. is drilling ahead at 8,708 ft. in shale after making a good recovery of gas-condensate in two tests in the 1 Santa Fe Ranch-Julian Pasture, wildcat 14.8 miles southeast of Encino. Drill-stem test run from 8,279-86 ft. recovered 730 ft. of 60°-gravity green condensate and an estimated volume of 4,000,000 cu. ft. of gas, and developed 95 psi. working pressure. Another test at 8,292-304 ft. recovered 385 ft. of 58°-gravity condensate and an estimated 2,700,000 cu. ft. of gas, and developed 132 psi. working pressure. The Kenedy County prospective discovery is in the northeast corner of the San Salvador Del Tule Grant, approximately 2 miles east-northeast of the Brooks-Hidalgo-Kenedy county line.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Aransas County: New pay at Mud Flats—Geo. W. Graham, Ryan, Hays and Burke 1 D. W. Grant, Blk. 51, 5th Addn. of Taft Farm lands, D. C. Barnett Sur., A-321, 8½ mi. N-NE of Gregory, top pay 8,559 ft., TD 9,525 ft., perf. 8,559-62 ft., IP: 185 bbl. oil per day, 9/64-in. choke, GOR 1,025, TP 1,200 psi., CP 1,650 psi., 41° gravity.

Duval County: New oil pool—Orlee Oil Co. 1 L. Lopez, J. Poitevent Sur. 455, A-1,315, 21 mi. N of Bruni, top pay 1,697 ft., TD 1,713 ft., perf. 1,699-702 ft., IP: 25 bbl. oil per day on pump, 20° gravity.

Oil discovery, "Forty Nine"—The Texas Co. 1 Duval County Ranch O A NCT-2, GB&CNG RR Sur. 49, A-715, 7½ mi. SW of Freer and 1 mi. N of Colmena field, top pay 1,574 ft., Cole sand, TD 2,622 ft., perf. 1,574-86 ft., IP: 19 bbl. oil per day on pump, GOR 326, 21.3° gravity.

Jim Hogg County: New oil discovery, "Ed Lasater field"—Gorman DeLange et al, 3 Mary M. Lasater Est., Sam Honey Sur. 270, approximately ½ mi. E-NE of 2 gas well, top pay 2,096 ft., TD 2,215 ft., perf. 2,096-98 ft., IP: 13 bbl. oil per day, 7/64-in. choke, GOR 960, TP 250 psi., CP 515 psi.

Nueces County: Gas condensate discovery (Mustang Island area)—Atlantic Refining Co. 1 Sam E. Wilson, William Little Sur. 594, A-210, 1½ mi. E of Mustang Island field, top sand 6,946 ft., TD 8,478 ft., perf. 6,946-56 ft., IP: 19 bbl. condensate and 3,500 M.c.f. gas, 3 16-in. choke, TP 2,700 psi.

Webb County: New gas pay at Moca—R. H. Smith 1 Duval County Ranch Co., Sec. 3, Blk. 21, Zapata County School Land Sur. 3, A-1,915, TD 1,960 ft., perf. 1,689-95 ft. (Yegua zone), IP: 1,800 M.c.f. gas on open flow, SIP 515 psi.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Atascosa County: Zander, Titus, Foster et al 1 Nana D. Newton, BS&F Sur. 1,817, A-136, 2 mi. SW of Hindes, dry, TD 6,435 ft.

Bastrop County: M. M. Miller 1 Annie Lee Alexander, N. W. Eastland Sur., A-156, 8 mi. S-SW of Bastrop, dry, TD 4,208 ft.

Caldwell County: C. C. Cooper 1 A. T. Cardwell, Pablo Martinez League, 7 mi. NE of Lockhart, dry, TD 1,559 ft.

Cameron County: J. J. Broadus Drilling Co., Inc., 1 C. J. Hoverson, Blk. 2, Lot 12, Capisallo Dist. Subd., 3 mi. SW of LaFeria, dry, TD 9,006 ft.

Milam County: Buda Oil Co. 1 Jim Bartlett, J. J. Acosta Grant, 17 mi. NW of Rockdale, dry, TD 2,063 ft.

L. P. Woodside, trustee, 1 Ellison, L. Taylor Sur., 6½ mi. NE of Clarkson, dry, TD 1,524 ft.

Nueces County: The Chicago Corp. 6 Weil Bros., in Saxet area, Share "A" of McBride Subd., 3 mi. W of Corpus Christi, dry, TD 6,991 ft.

San Patricio County: William F. Morgan 1 San Antonio Loan & Trust Co., Mal-

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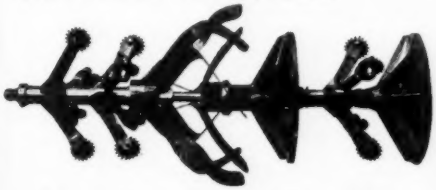

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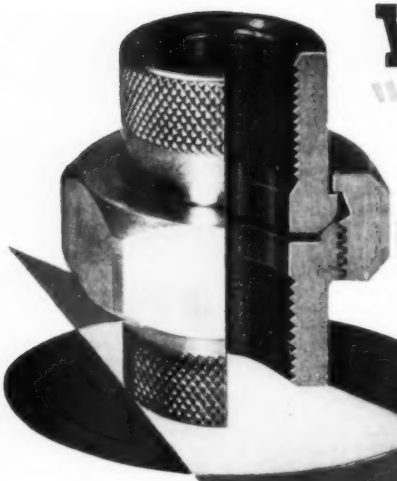

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com McAuley Grant, 3 mi. SW of Sinton, dry, TD 7,415 ft.

Starr County: Bairdige & King, Inc., 3 T. B. Slick Est., El Panal Grant, 2 mi. SE of El Panal field, dry, TD 5,910 ft.

Morris Cannan 1 San Antonio Loan & Trust Co., El Javalia Grant, 3 mi. W of Cuevitas, dry, TD 2,520 ft.

Webb County: W. F. Houser 1 Z. Lopez, Sur. 728, 15 mi. N of Bruni, dry, TD 2,753 ft.

O. W. Killam 1 Zaragoza Laurel, Sur. 1,119, 3 mi. E of Mirando City, TD 3,356 ft.

Williamson County: Jessee Russell 1 A. B. McGill Est., Thomas F. Gray Sur., 4½ mi. SE of Bertram, near Burnet County line, dry, TD 3,000 ft.

Zapata County: Don H. Marsh et al 1 Julian Ramirez et al, Blk. 8, Share "A," Villa Grant, 30 mi. SW of Hebbronville, dry, TD 2,508 ft.

TEXAS GULF COAST

Jackson County Gets Gas Discovery

HOUSTON. — Sohio Petroleum Co. has completed the 1 L. M. Nyeguard et ux for a gas discovery in Jackson County. Hole was drilled to a depth of 6,728 ft. and pipe set to 6,640 ft. Through perforations at 6,416-21 ft. the well flowed gas and condensate with no gage, and was shut in. Shut-in pressure was 2,475 psi. The discovery is located in Sutherland Survey, approximately 2 miles north of the Sterling gas field and 4 miles north of the Ganado oil field.

Hunt Drilling Co.'s 1 MacGregor, wildcat located within the city limits of Alvin, Tex., is the cause of much rumor and lease play in that area. Hunt has released no information on the well, although they did admit a test was made at 10,800 ft. in the Frio which indicated a heavy gas well. Originally, the test was projected to the Vicksburg, but officials stated it would be too dangerous for the people of Alvin to try that depth. They said the well will be completed in the Frio. Operators also admitted that they had drilled below 11,000 ft.

Fifteen miles north of Woodsboro, in Bee County, Bridwell Oil Co. of Wichita Falls has drilled to a depth of 5,610 ft. in the 1 F. V. Thomas, wildcat venture in the John Kelly Survey. Five-and-one-half inch production string was set at 5,047 ft. and operators are completing the well as a gas discovery.

Eastern States Petroleum Co. and associates have reached a depth of 9,453 ft. in their wildcat, the 1 W. F. Mayes et al, E. Dorr Survey, Abstract 74, and are now preparing to plug back to test sands higher in the hole. Operators previously carried on extensive testing operations in the hole around 7,700 ft. and 7,900 ft. A small amount of oil and gas was tested through perforations at 7,955-70 ft., and a small amount of oil was swabbed from perforations at 7,942-48 ft. Small amount of oil was swabbed from 7,910-22 ft., and operators went further up the hole and reperforated from 7,890-802 ft. from which a small amount of gas was swabbed.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCAT

Austin County: New oil pool—Magnolia Petroleum Corp. 1 Joe Vitek, S. F. Austin League, A-7, 1 mi. SW McDowell, Tex., just off W side of San Felipe Dome, top sand 8,064 ft., TD 8,202 ft., perf. 8,069-81 ft., IP: 142 bbl. oil per day, ¼-in. choke, GOR 840, TP 230 psi., 30.7° gravity.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Brazoria County: C. H. Alexander 1 J. E. and Mary Harriman, HT&B Sur. 20, A-473, 2½ mi. NW of Alvin townsite, dry, TD 7,028 ft.

Gulf Oil Corp. B-1 Donald K. Poole et al,

Allen Dome area, William & Thomas Alley Sur., A-2, 5.5 mi. SW of Gulf's 1 S. S. Perry, dry, TD 7,515 ft.

Galveston County: Stanolind Oil & Gas Co. A-2 St. Lse. 31,685, offshore, dry, TD 10,543 ft.

Hardin County: Stanolind Oil & Gas Co. 1 Doty & Jackson, W. N. Cox Sur., 12 mi. N of Silsbee, dry, TD 7,600 ft.

Harris County: G. S. Rowlett & W. G. Bryan 1 Fritz Beckendorf, TTRR Sur., A-1,457, 2½ mi. NE of Clodine field, 1 mi. E of Clodine townsite, dry, TD 367 ft.

The Sparta Oil Co. 1 John M. Counter et al, H&TC RR Co. Sur., Sec. 62, Blk. 2, 3 mi. NE of Katy, dry, TD 7,650 ft.

The Texas Co. 1 W. O. Bartle, William White Sur., A-829, 6 mi. NE of Tomball, dry, TD 9,800 ft.

Montgomery County: Stanolind Oil & Gas Co. 1 H. C. Nichols, David W. Weir Sur., 8 mi. W of Tomball, 3 mi. W-NW of Sterling's 1 Schweinke, dry, TD 2,010 ft.

Tyler County: American Republics Corp. 1 V. Wiess fee, V. Wiess Sur., 4 mi. SE of Spurger and ¾ mi. NW of Camp Eleven, dry, TD 9,400 ft.

Wharton County: Humble Oil & Refining Co. B-1 Mentor Northington et ux, in Bonus area, Andrew Rabb Sur., A-53, 3½ mi. NE of Eldridge, dry, TD 12,000 ft.

PERMIAN BASIN

Dual Strike Completed In Gaines County

MIDLAND—Samedan Oil Corp. 1-D-E-A Andrews, NW NE 19-A24-PSL, in southern Gaines County, was reported completed this week in both the Ellenburger and Devonian. The discovery is about ½ mile northwest of shallower production in the Robertson field, and 3 miles north of Ellenburger and Devonian production in the Flanagan field. Based on an estimated elevation of 3,330 ft. in the Flanagan area, Samedan's well checked 287 ft. high on the Ellenburger pay and 291 ft. high on the Devonian pay. Gravity of the oil from both pay zones, in both areas, were approximately the same. Completion details are listed below.

In Irion County, 1 mile northwest of Monument, C. M. Page 1 Mrs. Elta Murphey, formerly John I. Moore operator, a 1946 Ellenburger failure at 8,398 ft., was reentered and cleaned out to around 1,326 ft. Plugged-back total depth was 1,620 ft. Operators set 9⅝-in. casing to 1,880 ft. and perforated in pay topped at 1,297 ft. Swabbing recovered 10 bbl. of 34°-gravity oil an hour, with fluid level standing 400 ft. from bottom. Completion potential was 66 bbl. of oil a day, on the pump.

Scurry County.—Official completion on Sun Oil Co. 2 Mae Lemons, Kelley field Strawn discovery in 205-97-H&TC, located 2,023½ ft. east of 1 Lemons, came through this week. Total depth was 7,680 ft., elevation 2,423 ft., ground, and top of pay at 7,643 ft. Initial potential was 110.4 bbl. of 39°-gravity oil a day, flowing through ¼-in. choke with gas-oil ratio of 790 cu. ft., under 50 psi. pressure on tubing and 950 psi. on casing.

Strawn exploration on the southeast side of the North Snyder field by Standard Oil Co. of Texas is to be started at the 1 Martin-Harrell, located 467 ft. from south and west lines of the southwest quarter, Section 386-97-H&TC. Projected depth was 7,600 ft. The new venture is northeast of Sunray Oil Corp. 1 Sentell, Strawn discovery.

Honolulu Oil Corp. 1 Walter Brown, 65-3-H&GN, 1 mile east of Dunn, recovered some 7,000 ft. of sulfur water on a 2-hour drill-stem test from 7,945-8,040 ft. Operators were to plug back and test a section near 4,500 ft. which had shown a slight kick.

R. W. Sutton 1 M. H. Thornburg, 77-3-H&GN, recovered 245 ft. of gas-cut mud on a drill-stem test from 7,246-78 ft., and drilled ahead below 7,288 ft. in shale.

Davis & Miles 1-A J. J. Schattel, Ellenburger discovery in 90-2-H&TC, northeastern Scurry County, flowed 23 bbl. of oil in 20 hours through 7/32-in. choke after being shut in for 72 hours. Operators were installing pump. Total depth was 7,781 ft., in dolomite, plugged back to 7,765 ft.

On the northwest edge of the Kelley field, R. J. Caraway 1 Percy Wilkirson, 248-97-H&TC, was reaming hole at 6,700 ft., total depth, in limestone, with no reef top reported.

Kent County.—The Texas Co. made location for a direct south offset to the Chapman Producing Co. 1 Cogdell, Canyon reef discovery. The new operation is the 2 P. L. Fuller, 467 ft. from north and west lines of Section 705-97-H&TC, just north of the Scurry County line, and some 8 miles north of its 1 Fuller Ranch.

In the southeast corner of Kent County, R. W. Sutton was reported ready to move in with rotary tools after setting surface pipe at its 1 Fleming Foundation, NE NE Section 53, Block K, T. A. Thompson Survey. Location is on a Hiawatha Oil & Gas Co. farmout, and 10 miles east of the Cogdell discovery.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Andrews County: Discovery—Stanolind Oil & Gas Co. 1-H David Fasken, NE NE 37-42-T1N-G&MMB&A, 1¾ mi. E North Cowden field, just N Ector County line, TD 4,909 ft., PB 4,860 ft., elev. 3,079 ft., Grayburg 4,530 ft., top pay 4,750 ft., pumped 55 bbl. of 31°-gravity oil a day, 24 bbl. water.

Gaines County: Discovery—Mid-Continent Petroleum Corp. 1 L. R. Nichols, NW NW 7-A10-PSL, 5½ mi. E and 1 mi. N

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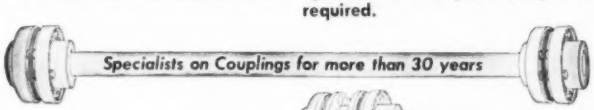

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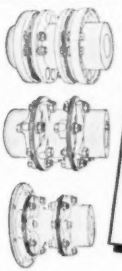

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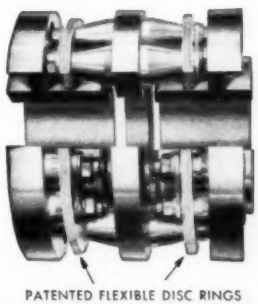

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Discovery: Samedan Oil Corp. 1-D-E-A Andrews, NW NE 19-A24-PSL, NW Robertson field, 3 mi. E Ellenburger production in Flanagan field. TD 12,090 ft., elev. 3,332 ft., dual completion, Ellenburger pay perf. 11,900-60 ft., flowed 262.7 bbl. 40°-gravity oil a day, no water, 1-in. choke, GOR 300 cu. ft., TP 50 psi.; Devonian pay perf. 10,056-70 ft., flowed 254.5 bbl. 36°-gravity oil a day, 14/64-in. choke, GOR 27 cu. ft., TP 540 psi.

Kent County: Discovery—J. A. Chapman Producing Co. 1 D. M. Cogdell, 467 ft. from S & W lines, 716-97-H&TC, 8 mi. N North Snyder field, ½ mi. N Scurry County line, TD 6,857 ft., elev. 2,431 ft., reef pay 6,841-47 ft., flowed 595.5 bbl. 41.7°-gravity oil a day, ½-in. choke, GOR 534 cu. ft., TP 115 psi.

Mitchell County: Extension—Superior Oil Co. 2 Jim Plaster, NW SE 4-28-T1S-T&P, 3 mi. SW Westbrook, 2 mi. N Superior 1 Dockery, Ellenburger discovery, TD 7,992 ft., elev. 2,196 ft., Ellenburger pay 7,987 ft., flowed 338 bbl. 44.9°-gravity oil a day, 14/64-in. choke, GOR 99 cu. ft., TP 700 psi.

Pecos County: Discovery—LaGloria Corp. 1 LaVerne L. Cresse, SE SW 78-11-H&GN, 2½ mi. NW Girvin, 4½ mi. NE Owego, TD 5,100 ft., elev. 2,324 ft., perf. Simpson 4,753-77 ft., pumped 105.3 bbl. 46.4°-gravity oil a day.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Borden County: Don Ameche et al 1 Clayton & Johnson, SW NE 30-31-T5N-T&P, 4 mi. W Gail, dry, TD 9,554 ft., elev. 2,626 ft., Grayburg 2,880 ft., Pennsylvanian 8,300 ft., Ellenburger 9,524 ft.

Crockett County: H. L. Cain 1 George Harrell, Tract 22, Blk. XX, 15 mi. S Ozona, dry, TD 1,227 ft. in shale.

Runnels County: Woods Drilling Co. et al 1 Woodrow Wilson, R. A. Smith Sur., 2 mi. SE Ballinger, dry, TD 4,125 ft., elev. 1,621 ft., Caddo 3,700 ft., Ellenburger 3,940 ft.

Tom Green County: C. L. Norsworthy, Jr., 1 Will C. Jones, 38-24-H&TC, 12 mi. SE Christoval, dry, TD 6,005 ft., elev. 2,251 ft., reef 5,275 ft., shale 5,664 ft., Ellenburger 5,897 ft.

Parker Petroleum Co. 1-A Harris Estate-Seaboard, 75-6-H&TC, 9 mi. W Funk field, dry, TD 1,865 ft.

Stanolind Oil & Gas Co. 1 Willis Johnson, Sec. 176-3¼, A. D. Neill Sur., 6 mi. SW Susan Peak field, dry, TD 5,812 ft., elev. 2,136 ft., Palo Pinto 4,520 ft., upper Strawn 5,000 ft., lower Strawn 5,247 ft., Ellenburger 5,690 ft., Wilburn sand 5,790 ft.

SOUTHEASTERN NEW MEXICO

HOBBS—Humble Oil & Refining Co. 1 Federal-Wiggs, SW NE 31-24s-27e, 16 miles due south of Carlsbad, was coring below 14,545 ft. in unidentified formation. On elevation of 3,460 ft., the well had top of the Devonian at 13,160 ft. A drill-stem test, time not reported, from 14,308-353 ft. recovered mud with no shows.

Amerada Petroleum Corp. 1 Birdie C. Roach, NW SW 26-12s-33e, Lea County, had total depth at 10,620 ft., and plugged back to 9,432 ft. in the lower Pennsylvanian. A 4,000-gal. acid treatment yielded 156 bbl. of oil and 40 bbl. of water, swabbing and flowing, in 2 hours and 39 minutes. The well then flowed 119 bbl. of oil and 41 bbl. of acid water in 11 hours.

Two miles southeast of the Hobbs field, Stanolind Oil & Gas Co. 1 Anna Foster, 23-19s-38e, plugged back from 8,021 ft., to 7,560 ft. and was shut in to build up pressure. Casing was perforated from 7,540-43 ft. and treated with 500 gal. of mud acid, after electrical surveys.

Two miles northwest of the Knowles field, The Texas Co. 1 Ertel, NE NW 27-16s-38e, was drilling below 11,622 ft. in sand

OKLAHOMA

Washita County Wildcat Finds Additional Oil Pay

CARTER OIL CO. is finding additional prospects of production in its 1 Galloway, NE NE NW 22-8n-18w, wildcat test located 2 miles west of Rocky, in Washita County, while drilling deeper in Granite Wash. Most favorable indications were given in a drill-stem test at 5,305-55 ft., where 780 ft. of clean oil, plus 30 ft. of oil-cut mud, was recovered. Latest test was made at 5,410-39 ft., where 3 ft. of clean oil and 28 ft. of oil-cut mud was obtained after a gas blow estimated at 250,000 cu. ft. per day. Previously reported drill-stem tests at 4,603-63 ft. and at 4,830-77 ft. also resulted in good shows of oil and gas. At latest report hole was drilling at 5,485 ft.

Barnsdall Oil Co. 1 Hughes, NE NE NE 28-8n-10e, 1¾ miles southeast of the Yeager pool and 1½ miles west of production in the Greasy Creek district, in Hughes County, bailed and swabbed at the rate of 25 bbl. of oil per day while testing Cromwell sand at 3,316-26 ft., indicating another new discovery. Hole is open from 3,301 ft.

Benson & Montin 1 Newberry, SW SW SW SW 16-7n-20w, 5 miles west of Cambridge and 10 miles west of Hobart, in Kiowa County, logged sand with oil stains from 1,105-22 ft., and has run 7-in. casing to the top of the section for testing. A drill-stem test, taking in the top of the section at 1,105-07 ft., resulted in a recovery of 30 ft. of gas-cut mud with no evidence of water. This prospective discovery is about 2½ miles north of the shallow oil discovery well completed early this month by C. C. Hudspeth. The latter, 1 Annis, SW SE SW 26-7n-2w, pumped 45 bbl.

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of oil daily from Pontotoc conglomerate at 995-1,003 ft., with hole open from 974 ft.

OKLAHOMA SUCCESSFUL WILDCAT

Creek County: Extension—Creekmore-Rooney et al 1 Fisher, NW NW SE 31-15n-10e, pumped 8 bbl. of 38°-gravity oil per day from Red Fork at 2,205-25 ft., TD 3,424 ft.

OKLAHOMA WILDCAT FAILURES

Cotton County: Nixon 1 Ma-voon-ey, SW SW SW 17-2s-12w, dry, TD 2,401 ft., sand 1,295 ft., Megargle 1,810 ft., Canyon 2,124 ft., sand 2,319 ft., Arbuckle 2,360 ft.

Dorian 1 Snipes, E 2 SW NW 9-5s-9w, dry, TD 2,638 ft., sand 2,112 ft. and 2,346 ft.

Garvin County: Vickers 1 Blythe, NE NW SW 29-1n-1e, dry, TD 1,776 ft.

McClain County: Magnolia Petroleum Co. 1 Jacobs, SE NW 34-5n-4w, dry, TD 7,440 ft., Gibson sand 6,352 ft., basal Pennsylvanian-Hunton 6,445 ft., Sylvan 6,697 ft., first bromide 7,177 ft., second bromide 7,380 ft.

Lincoln County: Merrell 1-A Landra, NW NW SE 10-12n-5e, dry, TD 3,488 ft., Oswego 3,325 ft., Prue 3,356 ft., geological wildcat.

Pawnee County: Curtis 1 Hamilton, NE SE SE 18-20n-9e, dry, TD 2,855 ft., sand 531 ft., lime 552 ft. and 1,581 ft., Layton 1,634 ft., Red Fork 2,286 ft., Bartlesville 2,391 ft., Mississippian 2,613 ft., Woodford 2,826 ft., Wilcox 2,849 ft.

Pontotoc County: B & B Drilling Co. 1 Jones, SE SE NW 15-4n-5e, dry, TD 2,505 ft., Viola 2,175 ft.

Pottawatomie County: Flynn 1 Hudson, NE NW NE 16-6n-3e, dry, TD 3,143 ft.

Stephens County: Christie-Stewart 1 Vosell, SE SE SW 23-1s-9w, dry, TD 2,715 ft., Hoxbar 2,204 ft.

Hammer 1 Davidson, NW NE NW 11-2s-8w, dry, TD 2,654 ft., sand 2,121 ft., 2,523 ft., 2,528 ft., and 2,550 ft., geological wildcat.

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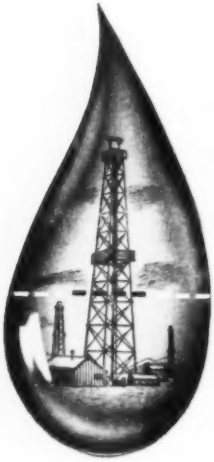

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CANADIAN FIELDS

Excelsior D-2 Gets One-Half Mile Extension

CALGARY—Rio Bravo Oil Co., Canadian operating medium of Superior Oil of California, has obtained its initial oil success in Western Canada. The well, Rio Bravo-Ronald No. 5-3 is located in Alberta Province, in LSD 5, 3-56-24w4, about ½ mile south of Imperial's D2 zone Devonian oil discovery at Excelsior. Excelsior is about 12 miles north of Edmonton city. On test the new producer rated an initial potential of 729 bbl. of clean water-free 36.6° A.P.I. oil daily. Producing interval is the 20-ft. jet-perforated D2 zone from 3,878-98 ft. Three groups are now each currently drilling wells, ranging from 1 to 3 miles from the two oil successes. The next month should bring information regarding the potentialities in this newly found Devonian area.

Okalta Oils, Ltd., of Calgary has started the first independent venture at Golden Spike, in the central Alberta plains. The well is about 3½ miles northwest of Imperial's Schoepp No. 1 D3 Devonian oil discovery well, and about 16 miles west-southwest of Edmonton. Okalta-Golden Spike No. 1, LSD 1, 9-52-27w4, was spudded and crew is now preparing to run surface casing. Imperial has drilled two unsuccessful wells in this general area, one 2¾ miles southeast of Okalta's new start and the other about 1½ miles to the southwest. About 3 miles southeast of Okalta No. 1, Imperial found D2 oil at its No. 5 driller and is currently proceeding in search of D3 zone.

British American-Leduc Leaseholds-Melin No. 2, LSD 1, 1-50-27w4, in the southwest sector of Leduc, flowed oil to the surface on its second drill-stem test in the D2 zone of Devonian. One hour test of interval 5,170 to bottom 5,200 ft., gave a natural gas flow rate of maximum 260,000 cu. ft. daily, plus a flow of oil 45 minutes after tester was opened. First test, of D2 interval, 5,148-70 ft., flowed oil in 35 minutes, with gas measured at 283,000 cu. ft. daily.

Thirteen wells were completed in Alberta during the past week, to boost total completions for the first 2 weeks of this year to 21. This week's total consisted of seven oil wells and six failures.

At Leduc-Woodbend three wells were placed on steady production and one failed to produce. Imperial Oil, Ltd., obtained two oil wells and a third was completed as a salt water disposal well. The Home-Anglo-C. & E. team placed its thirteenth successful Woodbend oil well on flow.

In the Redwater oil field the Lease 64 Ltd.-British American Oil Co. team got its initial oil success on the quarter section acquired from the Alberta Government by Tanner Bros. Syndicate of Calgary. The Texaco-McColl team added another producer to its Redwater wells to boost total to 22 and Imperial completed its 103rd successful oil well.

Rio Bravo Oil Co. obtained its first Canadian oil production at its initial Excelsior well which was completed this week.

Five exploratory wells on the central Alberta plains finished drilling this week, and failed to find commercial oil production.

UNSUCCESSFUL WILDCATS THIS WEEK

Rio Bravo-Ronald No. 1-6, LSD 1, 6-38-15w4, TD 8,373 ft.

Hudson's Bay-Commonwealth No. 1, LSD 16, 27-48-6w4, TD 3,643 ft.

Spike-Redwater-Feniak No. 1, LSD 15, 23-56-19w4, TD 3,984 ft.

Amcan-Texaco-Glen Park No. 1, LSD 1, 12-49-28w4, TD 6,500 ft.

Mercury-Leduc Consolidated-Nisku West No. 1, LSD 8, 33-50-25w4, TD 5,589 ft.

KANSAS

Wildcat in Berland Area Shows for Oil Production

NADEL & GUSSMAN 1 Sutor, NE NE SE 26-10-20, prospective new pool-opener in the area 1½ miles southwest of Berland pool, in southwestern Rooks County, swabbed 40 bbl. an hour during the first 3 hours while starting tests in Arbuckle lime, topped at 3,728 ft. (1,579 ft.). Hole is bottomed at 3,729 ft.

In southern Stafford County, another wildcat, L. B. Stabbleford 1 Harter, NE NE SW 30-24-13, 2½ miles southwest of the St. John pool, is showing for production from Simpson sand, in which casing was perforated at 4,167-71 ft. During the first 3 hours, it swabbed 14 bbl. of fluid, 95 per cent oil. Hole originally was drilled to 4,250 ft. in Arbuckle lime, topped at 4,250 ft., on which casing was cemented. No indications of production were given in the Arbuckle.

Texas Pacific Coal & Oil Co. 1 Krehbiel, SE SW SE 11-20-3, which is giving prospects of opening another new pool a mile southwest of the Johnson pool, in McPherson County, had a 1,700-ft. oil fillup after drilling out plug at 3,015 ft. in the Mississippian, drilled to a total depth of 3,054 ft.

In southern Ellis County, Alpine Oil & Royalty Co. 1 Leiker, SE SE SW 18-15-17, has been completed as the discovery well of the Wheatland pool with a potential of 152 bbl. of oil per day from Arbuckle lime at 3,569-89 ft. (—1,569-89 ft.). The discovery is 2½ miles northeast of the Schoinchen pool.

KANSAS SUCCESSFUL WILDCAT

Cowley County: K. T. Weideman 1 Johnson, SW NW SE 31-32s-4e, pumped 10 bbl. of oil per day from Bartlesville sand at 3,206-22 ft.; Layton 2,560 ft., Kansas City 2,740 ft., basal Kansas City 2,854 ft., TD 3,222 ft.

KANSAS WILDCAT FAILURES

Brown County: National Associated Petroleum Co. 1 Georgson, SW SW SW 11-3s-16e, dry, TD 3,433 ft., Lansing 1,044 ft., Kansas City 1,146 ft., basal Kansas City 1,374 ft., Mississippian 2,343 ft., Kinderhook 2,586 ft., Hunton 2,810 ft., Maquoketa 3,314 ft., Viola 3,905 ft.

Butler County: Aladdin Petroleum Co. 1 Sontag, NE NE SW 12-29s-6e, dry, TD 3,243 ft., Kansas City 2,082 ft., Marmaton 2,288 ft., Mississippian 2,755 ft., Kinderhook 3,111 ft., Arbuckle 3,195 ft.

Harrison County: J. P. Gaty 1 Harrison, SW SW SE 9-28s-2e, dry, TD 3,365 ft., Kansas City 2,487 ft., basal Kansas City 2,674 ft., Simpson 3,262 ft., Arbuckle 3,360 ft.

Rush County: Pabco Drilling Co. et al 1 Button, SE SE NW 32-19s-18w, dry, TD 4,140 ft., Hoxbar 3,645 ft., Dodge 3,670 ft., Lansing 3,689 ft., conglomerate 4,095 ft., Arbuckle 4,140 ft.

Russell County: Sterling Drilling Co. 1 Feller, NW NW SW 15-12s-15w, dry, TD 3,368 ft., Hoxbar 2,927 ft., Lansing 2,975 ft., Arbuckle 3,358 ft.

Scott County: Amerada 1 Melchert, NE SW NE 33-17s-32w, dry, TD 4,342 ft., Greenhorn 950 ft., Dakota 1,070 ft., Permian 1,530 ft., Blaine 1,805 ft., Immeran anhydrite 2,324 ft., Wellington 2,603 ft., Krider 2,912 ft., Topeka 3,760 ft., lime 3,972 ft., St. Genevieve 4,658 ft., St. Louis 4,697 ft., Spurgeon 4,845 ft., Warsaw 4,960 ft., Burlington 5,058 ft., Kinderhook 5,105 ft., Viola 5,224 ft., Arbuckle 5,290 ft.

Stafford County: Derby Oil Co. et al 1 Gunn, SE SE NW 1-21s-13w, dry, TD 3,561 ft., Hoxbar 3,100 ft., lime 3,221 ft., Lansing 3,239 ft., Simpson dolomite 3,490 ft., Simpson shale 3,493 ft., Arbuckle 3,561 ft.

Wabaunsee County: C. L. Carlock et al 1 Waugh, SE SE SW 13-13s-10e, dry, TD 3,405 ft., Lansing 1,575 ft., Kansas City 1,720 ft., basal Kansas City 1,935 ft., Mississippian 2,613 ft., Kinderhook 2,906 ft., Hunton 3,099 ft., Maquoketa 3,245 ft., Viola 3,325 ft.

ILLINOIS

Hamilton County Wildcat Shows for Oil Production

MATTOON.—A prospective new producing spot located in the area just west of the Dale-Hoodville Consolidated pool and east of the northeast end of the Rural Hill pool, in Hamilton County, is indicated by showings encountered by Calvert Drilling, Inc., and associates in their 1 Suttle, SW NW SW 4-6s-6e.

Showings were in the Aux Vases sand logged at 3,094-3,131 ft., and in which a drill-stem test, taking in an interval at 3,094-3,138 ft., gave a recovery of 330 ft. of oil-cut mud without water. Testing tool was open 32 minutes. Gas showed within 32 minutes after the tool was opened. Hole was deepened to 3,261 ft. following the test, where a second drill-stem test was made taking in an interval from 3,237 ft. The latter test gave a recovery of 50 ft. of oil-cut mud plus about 120 ft. of muddy salt water. Casing has been run to 3,238 ft. with an alloy section placed opposite the upper prospective pay zone at 3,098-3,128 ft.

Davis & Johnson 1 Moore, NE NE SE 12-2n-10e, 2½ miles west of nearest production in the Parkersburg Consolidated pool, 2½ miles south of Calhoun, in Richland County, continues to show for a good producer. Testing McClosky lime at 3,272-77 ft., it flowed 66 bbl. in the first 2 hours

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without any acid. Given a 2,000-gal. acid treatment, it flowed 415 bbl. in the first 15 hours. During the next 8 hours it made 158 bbl.

ILLINOIS WILDCAT FAILURES

Edgar County: F. B. Cline 1 Miller, SE NW NE 10-12n-11w, dry, TD 1,026 ft. Joe Lawrence 1 Junction, SE SE NW 35-13n-14w, dry, TD 525 ft.

Jefferson County: J. W. Everhart 1 Sulcer, NE SE NE 21-3s-1e, dry, TD 2,454 ft.

Lawrence County: W. O. Allen 1 Allender, NE SW SE 4-2n-12w, dry, TD 2,250 ft.

Madison County: Columbus Exploration Co. 1 Kunz, NE NE SW 9-4n-5w, dry, TD 2,079 ft.

Montgomery County: Mazzarino & Neary 1 Marok, SW NE NW 32-7n-4w, dry, TD 910 ft.

Sangamon County: Werner & Kluzek 1 Dietel, NW NE NE 6-15n-3w, dry, TD 2,250 ft.

Washington County: Alexis Ent. 1 Reichmann, SE NE NW 25-1s-1w, dry, TD 3,412 ft.

White County: C. E. Skiles 1 Brimblecomb, NE NE SE 21-5s-10e, dry, TD 3,130 ft.

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OHIO, KENTUCKY

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COLUMBUS—Frank Brendel et al 1 Harry Williamson, Section 15, Jackson Township, Muskingum County, ½ mile east of recent oil production on O. M. Phillips, gaged 565,000 cu. ft. natural. The sand logged at 2,963-3,012 ft., was shot and the open flow increased to an estimated 1,250,000 cu. ft. when shut in.

The Mid East Oil completed another good well along the west side of the Baker pool in Section 33, Hopewell Township, Perry County, on R. R. Weed. Clinton sand was found at 2,917-58 ft. with 100,000 cu. ft. and 20 bbl. natural. After shot the gage was 500,000 cu. ft. and 113 bbl. in 24 hours. In the same township, Wasson & Co. drilled in a small gasser on 1 Walter Daniels, Section 26. Sand came in at 3,012-52 ft. with 100,000 cu. ft. natural and 160,000 cu. ft. 21 hours after shot.

The last 4 wells completed south of Roseville in Harrison Township, Perry County, had initial 24-hour production after shot as follows: B. G. Davis et al 1 Strahl, 160 bbl.; J. L. Swingle et al 3 Nelson, 40 bbl.; Mid West Oil 1 Goodlive, 14 bbl.; and Natural Gas 1 Hazlett & Borbing, 10 bbl.

Wm. Hoey 1 Amheiser-Webster, Lot 75, Harrisville Township, Medina County, gaged 400,000 cu. ft. natural in Upper Clinton at 2,760-68 ft., and shut in after shot at 745,000 cu. ft.

EASTERN KENTUCKY

ASHLAND—In extreme southern Boyd County and adjoining the Lawrence County line, W. S. Perry et al are still in the process of cleaning out at their 1 Phil Preece, 5-U-82, a semiwildcat stepout from old Bolts Fork pool. Operators are 10 ft. off bottom with some oil showing in the hole. Total depth is 1,844 ft. in the Berea (Mississippian) sand topped at 1,758 ft.

An important wildcat is now in process of being drilled a mile south of production in Furnace (Deep) gas field. It is the Raydure et al 1 Chris Tipton, located in 3-O-68. Objective will be the St. Peter gas-bearing sand which is productive in Furnace field. Operators are drilling below 1,500 ft.

WESTERN KENTUCKY

OWENSBORO—Cherry-Kidd 1 Wilson, C S½ 8-O-22, which opens a new producing area northwest of Dixie and south of Corydon, in southwestern Henderson County, has been completed pumping 97 bbl. of oil per day. Pay zone is Cypress sand at 2,188-92 ft. with bottom of hole at 2,198 ft. On swabbing tests, the well made 175 bbl. per day. Pay zone was shot with 15 qt. of nitro.

Iley Browning, Jr., 1 Crowley, SE NE SE 13-N-23, second well for the area opened in December south of the Poole Consolidated pool, in Webster County, pumped at the rate of 22 bbl. of oil per day in testing Palestine sand at 1,631-41 ft. It is a location north of the discovery well, which also showed for a producer in this pay but was completed in Hardinsburg sand at 2,604-20 ft. The new well was drilled to a total depth of 2,674 ft. It failed to get production in the lower horizon, and was plugged back to 1,720 ft., where casing was run with an alloy section opposite the Palestine.

WESTERN KENTUCKY WILDCAT FAILURES

Daviess County: Charles Miller et al., 1 Aud, SW SW SW 13-O-32, dry, TD 1,083 ft.

Felmont Oil Corp. 1 Brown, NW SE NE 16-P-33, dry, 1,213½ ft.

Hancock County: Felmont Oil Corp. 1 Williams, S½ NW NE 6-Q-33, dry, TD 1,358 ft.

INDIANA

EVANSVILLE—National Associated Petroleum Co. 1 Lockie Meuer, SE SW NE 2-4n-7w, which opens a new McClosky lime pool a mile north of Plainville, in Daviess County, and 12 miles from any other production, has been completed flowing at the rate of 200 bbl. per day through ½-in. choke following a 250-gal. acid treatment. Pay zone is at 732-41 ft.

The same company's 1-A Lockie Meuer, drilled to the Salem lime, where, at 1,157-72 ft., it was estimated good for 3,000,000 cu. ft. of gas daily, is being deepened for exploration of Devonian potentialities before being completed. Devonian is expected around 1,950 ft. This well was drilled as a twin to No. 1, the McClosky discovery producer.

In the meantime, two additional McClosky wells are being completed to confirm the discovery in this pay. No. 1 Earl Meuer, NW SW NE 2-4n-7w, a northwest diagonal offset to the discovery well, is estimated good for 125 bbl. per day at a total depth of 762 ft. No. 1 Foust-McBride, SE SE NW 2-4n-7w, two 10-acre locations west of the discovery, is flowing an estimated 100 bbl. per day with pay at 754-70 ft.

INDIANA SUCCESSFUL WILDCATS

Posey County: Rush Creek Oil Co. 2 Shoultz, NW NE SE 12-5s-14w, IP 50 bbl., Palestine 2,039-42 ft., TD 2,049 ft. (extension New Harmony East pool).

Ryan Oil Co. 1 Egli Heirs, NE SE NE 18-6s-12w, IP 22 bbl., Cypress 2,373-80 ft., TD 2,385 ft. (extension Caborn pool).

INDIANA WILDCAT FAILURES

Gibson County: J. B. Buchman and C. E. O'Neal 1 Kneipp, NE NW SW 1-3s-12w, dry, TD 2,590 ft.

Warrick County: J. B. Buchman 1 Hendrickson, NE NE SW 24-5s-7w, dry, TD 1,505 ft.

Wells County: H. C. Lighter et al., 1 Minnick, SE NE NE 13-25n-11e, dry, TD 1,036 ft.

MICHIGAN

Saginaw County Test Shows Promise

MOUNT PLEASANT.—A possible new Dundee oil discovery was under test in Birch Run Township, Saginaw County, as Graham Wilcox 1 Shaw, SE SE NE 25-10n-6e, showed from 100 to 400 ft. of free oil natural from that zone over a 40-hour period and was being acidized. Dundee top was logged at 2,460 ft. with first oil show coming in at 2,475-78 ft., and an increase in oil pay showing at 2,488-95 ft. Present total depth of the hole is 2,522 ft. This well is located about 3 miles west of the Arbela Dundee oil pool, across the Tuscola County line, and appears to have logged oil at about the same point in the section as it was found in Arbela. It is also located on the same general structural feature as the Arbela field.

Supervisor of Wells P. J. Hoffmaster and the State Oil Advisory Board have scheduled a public hearing at Lansing for January 25 to review a request to establish a 40-acre well spacing and drilling unit for Richfield horizon wells in the Butman field area, Gladwin County. An emergency order establishing this type well spacing for 21-day period was released by the Supervisor effective January 6. If the general spacing rule is enacted as requested, Richfield zone wells will be permitted one to each governmental surveyed quarter-quarter section of land. These developments were the direct result of Superior

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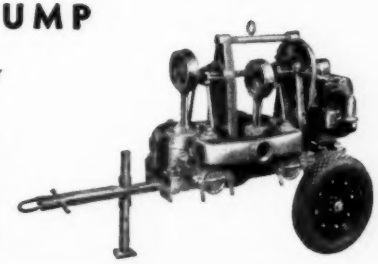

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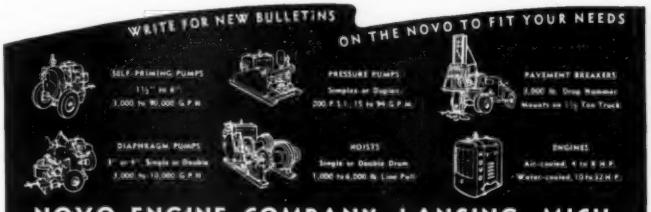

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● Whether you have management or operating responsibility we have a new, informative booklet that's tailored for you. It will give you valuable information on day and night protection of property and persons by means of fence that's also tailored to your requirements. Your Page Chain Link Fence can be of the style, height and metal that is best for you, no matter what the conditions. And it will be erected by experienced, local experts who offer more than a product—a complete fence service. Write for DH-142. With it we will send name and address of nearest Page Fence specialist.

Write to PAGE FENCE ASSOCIATION in Monessen, Pa., Atlanta, Bridgeport, Chicago, Denver, Detroit, Los Angeles, Philadelphia, Pittsburgh, New York or San Francisco.

PRODUCT OF PAGE STEEL & WIRE DIVISION OF AMERICAN CHAIN & CABLE COMPANY, INC.

Oil Co.'s recent Richfield discovery in Section 12-20n-1w, Gladwin County, where a pumping unit was being installed this week.

The Department of Conservation issued 999 drilling permits for oil and gas wells during 1949—a record high since 1941 when 1,044 permits were written. The all-time record in Michigan was set in 1939 when 1,465 drilling permits were approved.

Another record was established in 1949 when 455 GT core-hole permits were approved, compared to 444 in 1948.

MICHIGAN WILDCAT FAILURES

Allegan County, Dorr Township: McClanahan Oil Co. 1 Kees, NE NW NW 21-4n-12w, Traverse 1,627 ft., dry, TD 1,680 ft.
Manlius Township: Jesse W. Matteson 1 Vos, SE NE NW 7-3n-15w, Traverse 1,476 ft., dry, TD 1,515 ft.
Isabella County, Chippewa Township: Merrill Drilling Co. 1 Powers et al, NE SE SE 31-14n-3w, Dundee 3,678 ft., dry, TD 3,719 ft.
Livingston County, Marion Township: Ashby Drilling Co. 1 Wilson-Bush, NW SW SE 1-2n-4e, Dundee 928 ft., dry, TD 1,118 ft.
Muskegon County, White River Township: Kenneth A. Fox 1 Dunes Camp Club, SE SW SE 10-12n-18w, Traverse 1,632 ft., dry, TD 1,654 ft.
Newaygo County, Croton Township: Augie Busk 1 Shutts et al, NE NE SW 20-12n-11w, Traverse 2,542 ft., dry, TD 2,574 ft.
Oceana County, Ferry Township: The Carter Oil Co. 1 Sumner, NE SW NE 20-14n-16w, Monroe 2,575 ft., dry, TD 2,581 ft.
Osceola County, Evart Township: Sun Oil Co. 1 Hunt et al, C NE 7-17n-8w, Stray 1,372 ft., dry in Marshall, TD 1,750 ft.

FOR TANK GAUGING, and the multitude of other necessary duties in and near TOXIC fumes, the Scott *Air-Pak* provides complete employee breathing protection.

Using AIR—not oxygen—the Scott *Air-Pak* can safely be worn in areas with high concentration of petroleum vapors. *Air-Pak* is available in a variety of models: BACK-PAK, (illustrated)—SLING-PAK and EXTENSION HOSE ASSEMBLY, protecting any number of men for minutes or uninterrupted safe hours.

ESTABLISHED IN 1932 Scott FOR SAFETY - FOR SERVICE

Over forty-five Oil Companies now use Scott Air-Paks in their operations.

In Canada: Safety Supply Company—offices in Toronto, Edmonton, and other Principal Cities.

SAFETY EQUIPMENT DIVISION
SCOTT AVIATION CORP.
221 ERIE ST., LANCASTER, N. Y.

CALIFORNIA

New Producing Spot for Devils Den Area

LOS ANGELES.—Gilliland Oil Co. and C. O. Davis have brought in a producer in their 1 Kalloch, 11-25s-18e, Devils Den area. The location lies between the Miller-Bump section and the Gilliland-Alferitz section. It is ¼ mile southeast of Miller-Bump production and ½ mile north of the Alferitz production. While further drilling is planned this well does not mean that the two producing sections will join. Almost all Devils Den production has been found in rather small, isolated faults.

The well bottomed at 2,345 ft. producing 40 bbl. per day of 22°-gravity oil. The Kettleman sand was topped at 490 ft. and top of Wagonwheel at 1,303 ft.

In the West Edison area the Mark Morris extension test, 2 Brandt, has given good indications of becoming a producer. Although the Santa Margarita showed gray at 3,332 ft., good shows were found through the Chanac, topped at 2,870 ft., and oil sand from 2,980 ft. to 3,120 ft. The well has been plugged at 3,130 ft.

Mar-Roo Syndicate has suspended work at their wildcat 1 Lampman in 36-28s-12e, Atascadero area of San Luis Obispo County. Middle Miocene was topped at 1,400 ft. Present total depth is 3,011 ft. Location at 36-28s-12e. No future plans have been announced for this try.

The Lloyd Corp., Ltd., has a new drilling record for the Ventura Avenue field with their 32-L.C. This well has bottomed at 14,130 ft. with 7⅝-in. casing to 12,484 ft. and 5-in. to 14,118 ft., including 943 ft. of perforations.

Transcall Drilling Co. with Cella Vineyards Corp. and Scott H. Dunham have combined to put down an 11,500-ft. test, 1 Transcall-Notten, in the Ventura Avenue field. Original location was under the name of Trans Oil Co. 1 Barnard-Notten.

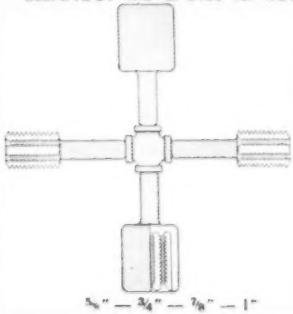
In the Bardsdale field, Union Oil has set location at 12-3n-20w for 2 Irwin. This is scheduled as an Eocene test.

The Texas Co. well 165 Shiells, in Shiells Canyon, Ventura County, has been placed on the pump. Production so far shows about 100 bbl. per day of salt water from a plugged depth of 8,453 ft.

The former Robert S. Rocco wildcat in the Santa Paula Creek area, 15-4n-21w, is now called Martin Oil Co. 1 Lottie B. McFann. The try has been idle for some time at 1,620 ft. Under the new owners preparations are being made to deepen the test.

Initial tests on the Richfield Oil, East Los Angeles test 7 U. P. Unit, at 9-2s-12w, were made on the interval 8,266-8,305 ft. After being open 65 minutes 2,050 ft. of oil and 90 ft. of salt water was recovered. Total depth is 8,313 ft.

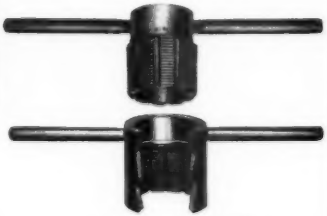
CLEANOUT TAP & DIES for RODS



⅝" — ¾" — ⅞" — 1"

PRODUCTION TOOLS
by *Baird*
THRU YOUR SUPPLY STORE
BAIRD MFG. CO.—TULSA

CLEANOUT TAP and DIES for TUBING



2" to 4" PLAIN and EUE ROUND and V-THREAD
Patent No. 2110618

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Use **DARCOVA**

composition valve cups,

seating cups and rings

The Original composition valve cup

still the best!

YOU'LL SAVE MONEY BECAUSE..

• Precise control of all materials and processes from lab to well means exceptional resistance to wear and deterioration . . . fewer pulling jobs! • Different textures, scientifically developed, fully proved, give peak efficiency and longer flex-life at any depth! • Precisely controlled sizes for any make or size pump . . . no misfit inefficiency! • Ask for genuine Darcovas at your supply store.

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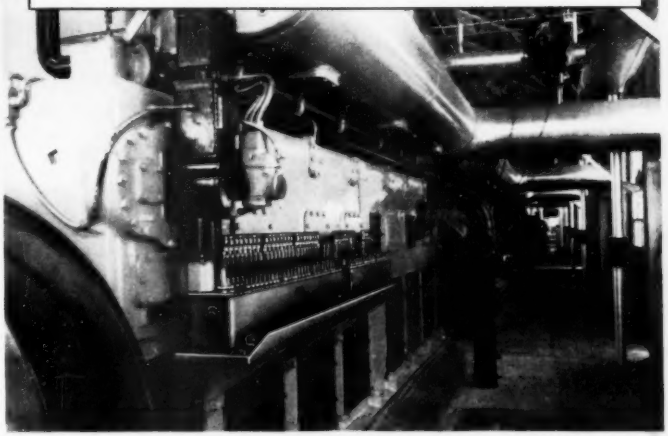
THE ORIGINAL COMPOSITION CUP

WILLIAMSPORT 1, PA.

In a large natural gasoline plant (and throughout the petroleum industry)



MANZEL LUBRICATORS KEEP MACHINERY MOVING

In this western Texas plant 11 compressors squeeze the light hydrocarbons from natural gas, changing it into gasoline. To insure a long lifetime of dependable, low cost operation, each compressor is equipped with a battery of ***Manzel*** Force Feed Lubricators.

Manzel Lubricators force an exactly metered amount of oil to each wearing point. They ***reduce*** consumption of lubricating oil, ***cut*** labor and maintenance costs, ***prevent*** costly breakdowns.

Specify ***Manzel*** Lubricators on your next installation . . . or write for advice concerning their use on your present equipment.

Manzel

DIVISION OF
FRONTIER INDUSTRIES
Inc.
336 BABCOCK STREET
BUFFALO 10, N. Y.

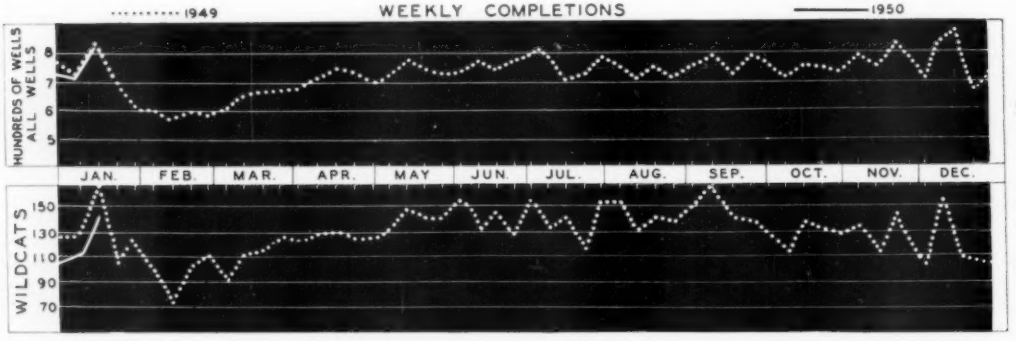
CURRENT STATISTICS

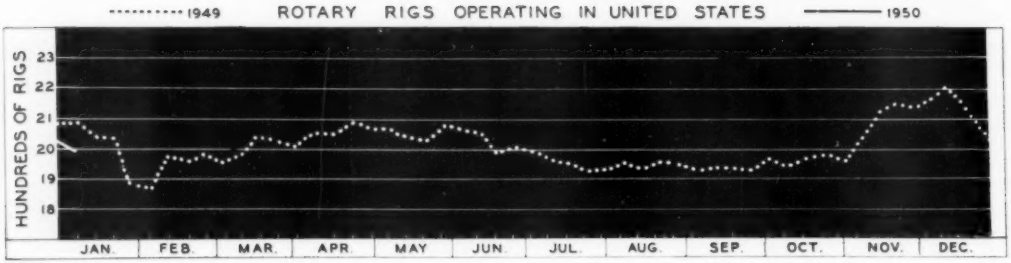
EXPLORATION

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JANUARY 14, 1950

	Total of all wells					Jan. 14		Wildcat completions and discoveries					Cumulative total, 1950				
	Comp.	Oil	Gas	Dry	Footage	1950	1949	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	14	7	0	*7	21,958	30	36	0	0	0	0	0	0	0	0	0	0
Pennsylvania	22	9	3	†10	35,604	46	74	0	0	0	0	0	0	0	0	0	0
West Virginia	6	1	4	1	16,011	20	21	0	0	0	0	0	0	0	0	1	1
Ohio	20	8	5	‡7	50,277	39	39	0	0	0	0	0	0	0	0	1	1
Indiana	15	4	0	11	34,754	56	40	2	0	0	3	5	2	0	1	6	9
Kentucky	13	9	0	4	12,999	40	19	0	0	0	3	3	1	0	0	3	4
Illinois	55	30	0	25	114,511	113	97	0	0	0	9	9	0	0	0	20	20
Michigan	15	4	0	11	36,308	39	39	0	3	0	8	8	4	0	0	16	20
Kansas	53	27	4	‡22	170,264	103	115	1	0	0	8	9	1	0	0	18	19
Neb., Mo., Iowa	1	0	0	1	4,316	1	0	0	0	0	1	1	0	0	0	1	1
Oklahoma	104	68	1	‡35	384,530	172	168	1	0	0	10	11	5	0	2	21	28
Texas	347	230	21	96	1,546,979	576	524	13	1	1	50	65	21	1	6	70	98
North Central (Dist. 7-B & 9)	93	43	1	§49	265,717	157	179	2	0	0	17	19	6	0	0	20	26
West (Dist. 7-C & 8)	87	79	0	8	488,428	131	120	6	0	0	6	12	8	0	0	14	22
Panhandle (Dist. 10)	37	28	8	1	110,496	74	33	0	0	0	0	0	0	0	0	0	0
Eastern (Dist. 5, 6, & 6-P)	26	20	2	4	119,854	49	22	0	0	0	3	3	0	0	1	5	6
Gulf Coast (Dist. 2 & 3)	57	34	7	16	348,457	90	91	1	0	0	10	11	3	0	1	14	18
Southwest (Dist. 1 & 4)	47	26	3	18	214,027	75	79	4	1	1	14	20	4	1	4	17	26
Louisiana	48	26	6	16	353,057	117	107	0	1	1	5	7	1	1	1	8	11
Northern	19	8	3	8	85,369	80	74	0	0	0	3	3	1	0	0	6	7
Southern	29	18	3	8	267,688	37	33	0	1	1	2	4	0	1	1	2	4
Arkansas	7	4	0	3	28,469	19	14	0	0	0	3	3	0	0	0	7	7
Mississippi	7	4	0	3	46,590	14	9	0	0	0	1	1	0	0	0	3	3
Southeastern States	1	1	0	0	3,292	3	4	0	0	0	0	0	0	0	0	0	0
Montana	4	1	1	2	8,144	5	7	0	0	0	2	2	0	0	0	2	2
Wyoming	35	28	0	7	172,603	39	18	2	0	0	5	7	2	0	0	7	9
Colorado-Utah	11	3	0	3	39,534	12	15	0	0	0	7	7	0	0	0	8	8
New Mexico	7	6	0	1	30,438	22	26	0	0	0	0	0	1	0	0	2	3
California	31	27	0	4	165,247	64	96	1	0	0	2	3	3	0	0	5	8
Dakotas	1	0	0	1	5,700	1	0	0	0	0	1	1	0	0	0	1	1
Total United States	817	497	45	275	3,281,585	1,531	1,468	20	2	2	118	142	41	2	10	200	253
Total previous week	714	403	67	244	2,393,456			21	0	8	82	111	21	0	8	82	111
Total January 15, 1949	834	473	49	312	3,189,271			26	1	1	140	168	50	2	3	241	296

Service wells included: *7, †9, ‡1, §2.





DAILY AVERAGE PRODUCTION FOR WEEK

	Jan. 14 crude oil	B. of M.† demand	Jan. 7 crude oil
Alabama	1,500		1,550
Arkansas	75,100		74,800
California	867,000		867,700
Colorado	59,300		65,400
Eastern	56,800		58,500
Florida	1,000		1,050
Illinois	176,900		186,200
Indiana	27,300		31,000
Kansas	255,400		245,650
Kentucky	26,300		27,400
Louisiana	539,825		539,575
North Louisiana	121,800		121,550
South Louisiana	418,025		418,025
Michigan	44,600		45,600
Mississippi	101,100		93,150
Montana	23,700		23,800
Nebraska	1,500		1,450
New Mexico	131,225		131,225
Oklahoma	398,400		416,350
Texas	1,929,000		1,929,000
Dist. 1 (Southwest)	26,200		26,200
Dist. 2 (Southwest)	112,850		112,850
Dist. 4 (Southwest)	178,200		178,200
Dist. 3 (Gulf Coast)	357,575		357,575
Dist. 5 (Eastern)	32,550		32,550
Dist. 6 (Eastern)	81,425		81,425
East Texas field	222,000		222,000
Dist. 7-C (West)	46,950		46,950
Dist. 8 (West)	572,850		572,850
Dist. 7-B (W. Central)	62,300		62,300
Dist. 9 (N. Central)	143,500		143,500
Dist. 10 (Panhandle)	92,600		92,600
Utah	3,100		3,200
Wyoming	130,500		129,900
Total United States	*4,849,550		4,872,500
Change from prev. week, down	22,950		
Canada	56,150		48,915

Total U. S. production January 1-January 14 †69,285,370 bbl.
Same period last year (crude plus cond.) 77,671,435 bbl.

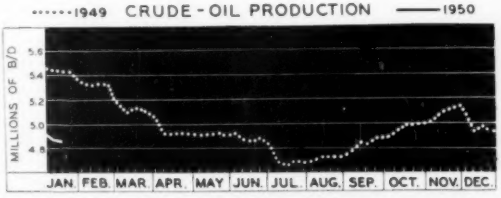
*Not incl. 86,460 bbl. condensate. †Incl. 1,231,020 bbl. condensate. ‡January demand not announced.

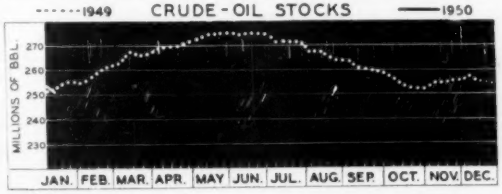
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

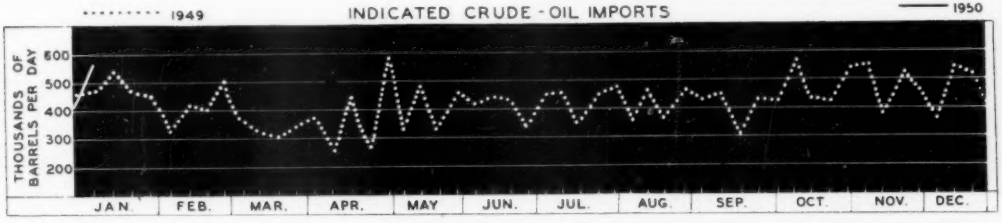
(Thousands of barrels)

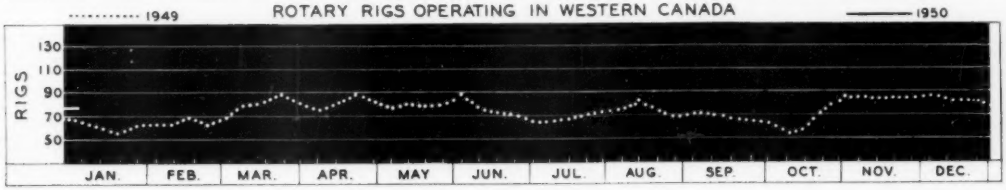
	Jan. 7, 1950	Dec. 31, 1949	Jan. 8, 1949
Pennsylvania Grade	2,745	2,837	2,910
Other Appalachian	1,810	1,879	1,492
Illinois, Indiana, Michigan	11,610	12,089	13,512
Arkansas	3,110	3,005	3,417
Louisiana	13,993	14,061	12,155
North	3,558	3,362	3,090
Gulf	10,435	10,699	9,065
Mississippi	2,053	2,254	2,694
New Mexico	7,397	7,622	6,350
Oklahoma and Kansas	37,999	38,073	35,468
Texas	112,419	114,534	120,317
East Texas	15,138	15,978	15,228
West Texas	41,124	42,157	47,046
Texas Gulf	29,450	30,141	29,766
Other Texas	26,707	26,258	28,277
Rocky Mountain	13,286	13,339	12,374
California	37,977	38,149	32,887
Foreign	6,825	6,607	7,426
Total United States	251,224	254,449	251,002

*Bureau of Mines.







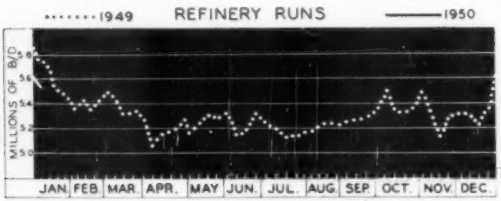


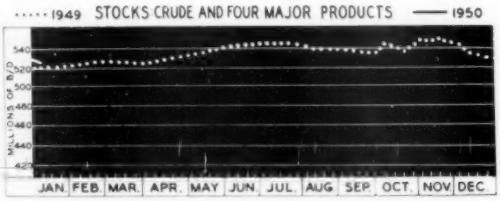
A.P.I. REFINERY REPORT, JANUARY 7

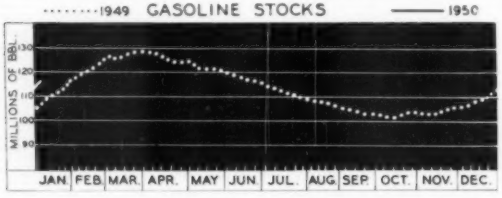
(Thousands of barrels)

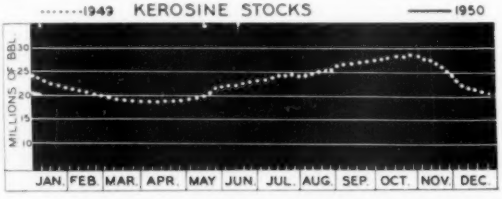
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, January 1949				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	851	359.2	51.3	185.4	217.3	23,975	8,745	23,979	11,668	810	312.8	33.6	192.9	223.3
Appalachian:														
District 1	91	44.4	5.6	12.0	10.3	2,750	321	838	343	104	44.3	8.1	14.8	15.2
District 2	69	31.3	5.9	9.0	13.7	1,328	128	189	103	71	37.3	4.3	6.5	15.8
Ind., Ill., Ky.	1,006	516.4	70.4	165.6	171.3	23,796	3,884	10,654	3,847	982	476.9	65.2	157.3	174.0
Okla., Kans., Mo.	448	253.2	25.3	90.3	61.3	11,356	1,047	5,226	1,454	435	225.9	24.8	77.2	75.5
Inland Texas	202	142.1	11.7	19.0	42.1	4,131	460	856	876	232	141.6	11.9	18.7	55.4
Texas Gulf Coast	1,310	615.7	115.3	276.7	238.0	17,573	2,777	14,470	6,096	1,400	628.1	111.5	288.2	247.7
La. Gulf Coast	462	233.2	75.8	104.6	51.7	6,934	1,300	3,946	2,033	441	188.4	62.4	101.2	67.1
N. La. and Ark.	75	27.1	5.9	12.1	14.0	2,668	383	670	268	72	29.2	8.4	9.6	16.1
Rocky Mountain:														
New Mexico	12	6.4		1.9	2.9	97	25	76	31	13	6.9	.5	1.7	3.4
Other Rocky Mtn.	161	83.0	6.7	30.1	32.3	3,802	257	1,689	645	151	68.5	3.1	24.5	37.1
California	837	360.9	10.0	143.0	336.0	18,364	887	12,745	34,237	930	378.4	6.1	170.2	417.1
January 7, 1950	5,524	2,672.9	383.9	1,049.7	1,190.9	116,774	20,215	75,338	61,601	5,641	2,538.3	339.9	1,062.8	1,347.7
December 31, 1949	5,626	2,721.6	353.7	1,084.4	1,206.3	113,497	20,838	77,801	61,675					
January 8, 1949	5,820	2,611.1	356.1	1,117.7	1,416.6	107,111	22,249	69,377	63,346					

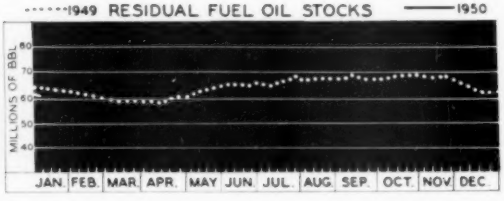
*At refineries including natural blended. †Finished and unfinished.

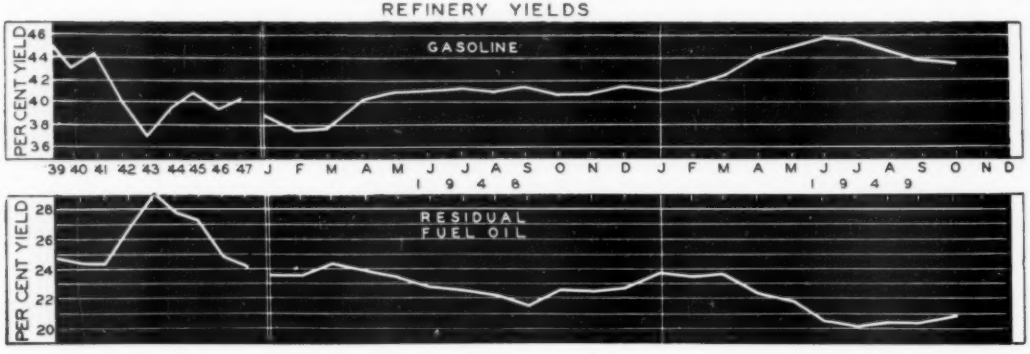











REFINERY YIELDS
GASOLINE
PER CENT YIELD
RESIDUAL FUEL OIL
PER CENT YIELD
39 40 41 42 43 44 45 46 47 J F M A M J J A S O N D J F M A M J J A S O N D
1948
1949

CRUDE PRICES
GRAVITY SCHEDULE

Gravity—	Calif. Hill, Signal	Kansas homa, Okla-	Tex.* Coast Gulf	Tex.† West
18-18.9	$1.53			
19-19.9	1.63			
20-20.9	1.73	$2.25		$2.12
21-21.9	1.82	2.27		2.14
22-22.9	1.92	2.29		2.16
23-23.9	2.02	2.31		2.18
24-24.9	2.12	2.33	$2.56	2.20
25-25.9	2.22	2.35	2.58	2.22
26-26.9	2.31	2.37	2.60	2.24
27-27.9	2.37	2.39	2.62	2.26
28-28.9	2.42	2.41	2.64	2.28
29-29.9	2.48	2.43	2.66	2.30
30-30.9	2.54	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.64	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Above changes do not include recent reductions of a few buyers applying principally to low-gravity grades.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.77
Beauregard Parish	2.86
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	3.54
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

SOME of the effects of the "June-in-January" weather in the northeastern states is shown by the drop in refinery demand for distillate fuels. Total indicated refinery demand for the 2-week period ended January 7 was 14 per cent less than in the same period a year earlier and 15 per cent less than the average for the first 3 weeks in December.

Lack of primary distillate storage in New York Harbor is resulting in some distress material. Some No. 2 was reported available at 7.8 cents a gallon. Threats of a coal strike and oil-truck drivers strike tended to increase fuel sales at the tank-wagon level but had little effect on barge sales because of the large volume of fuel stocks.

Kerosine in the harbor continued very firm at 9.5 cents a gallon. However, the draft on kerosine stocks for the country as a whole averaged only 400,000 bbl. per week for the 2 weeks ended January 7 compared with an average of 1,400,000 bbl. per week in the first 3 weeks of December.

Fuel markets in the Mid-Continent have been holding up much better than the East Coast because of the more nearly normal weather in areas to which this fuel moves. Kerosine prices ranged from 7¼ to 7½ cents a gallon while the low for No. 2 rose to 7⅜ cents.

Gasoline prices moved slightly lower during the week, both on the high and the low of the Group 3 spot market as stocks continued to rise. Stocks for the country increased 6,600,000 bbl. in 2 weeks ended January 7 and were about 10,000,000 bbl. above last year. While most areas have had sufficient storage to care for the stock increase, at the recent rate of increase it would take less than 4 weeks to reach the level of last year's peak at the end of March.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of January 16, 1950. Figures are f.o.b plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Tex. Gulf Coast
Regular gasoline, 74-76 octane	9⅜-9⅞	10.5-11.1	9-9¾
Premium gasoline, 78-80 octane	10⅜-10⅞	11.5-12.1	9¾-10¾
42-44 w.w. kerosine	8¼-8½	9.5	8¼-8½
No. 2 straw fuel oil	7⅜-7½	7.8-8.5	7-7¼
No. 6 residual	$1.25-1.35	$2.05	$1.65-1.75

NATURAL GASOLINE

	Group 3	North Texas	N La
Grade 26-70	5⅞	5⅜	5⅝
Grade 18-55	7.1	6.5	6.8

LUBRICATING OILS
SOUTH TEXAS

200 vis., No. 2-3 neutral	10.5
750 vis., No. 3-4 neutral	12.75
2,000 No. 5-6 neutral	14-14.5

LUBRICATING OILS
Mid-Continent

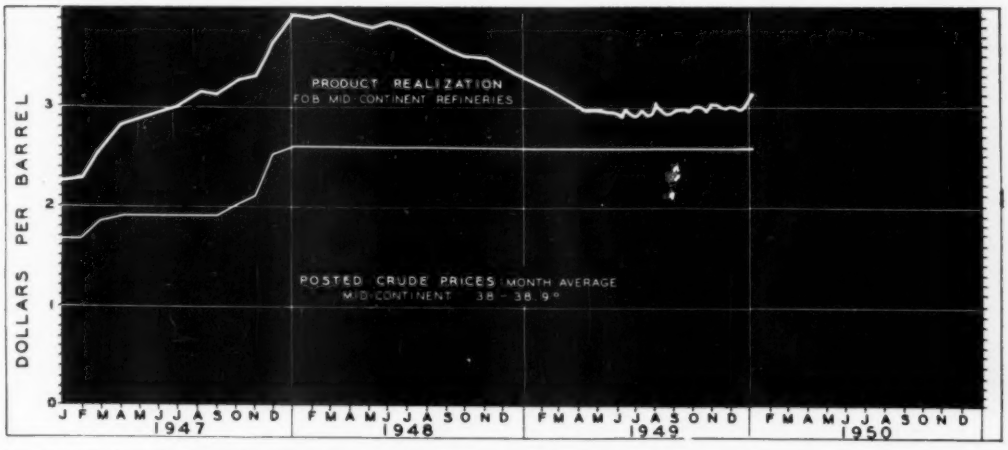
150-160 vis., D bright stock, 0-10 pp.	17-19
200 vis., No. 3 neutral, 0-10 pp.	11.5-14

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	19.5-20.5
180 vis., 0 p.t. neutral	20.5-21.5

WAX
Mid-Continent

132-134 A.M.P.	4.25



In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil

EQUIPMENT MEN ... in the News

Los Angeles Nomads Hear Five Speakers

The December meeting of the Los Angeles chapter of Nomads was highlighted by several exceptional speakers, who presented a variety of topics regarding petroleum around the world.

E. C. (Ned) Brown, Brown Drilling Co., spoke on conditions in the Middle East, with special attention to the foreign market for Middle East oil, pointing out that per capita consumption in Europe is minute compared with the United States. Brown Drilling Co. presently has a drilling crew in the Neutral Zone of Kuwait.

Market for equipment in Latin America was discussed by Earl Rees, Patterson-Ballagh Division of Byron Jackson Co. He described drilling prospects in Mexico, both as to Pemex and American Independent Oil Co. plans. Rees has just returned from an extended trip throughout Latin-American countries.

Jay Gould, active for many years in oil operations outside the United States, discussed the oil picture in the Middle East from the standpoint of Anglo-Iranian Oil Co.

Richmond Exploration Co.'s Charles Blanchet, home on leave, described housing and other factors affecting general living conditions for Americans in Latin America.

The last speaker of the evening was "Beans" Riordan, retired National League umpire, who told stories taken from his years of umpiring major-league baseball.

Earle Boggess, Baker Oil Tools, Inc., inducts new members Joe Schlarb, Chiksan Co.; D. M. Bernt, Pacific Perforating Co.; D. J. Bergeron, Baash-Ross Tool Co.; Onos Lindsay and Gordon Jackson, both of Eastman Oil Well Survey Co., at the December meeting of Los Angeles Nomads.

Guests at the Los Angeles Nomads December meeting seated are: M. Sawatari, N. Yakamoto, and T. Oinomikado, all of Imperial Oil Co. of Japan. Speakers standing are Jay Gould, E. C. Brown, "Beans" Riordan, and Charles Blanchet. Earl Rees was not present for the picture.

Tesco Appoints McCoy As Metallurgist

H. R. McCOY

Appointment of Horace R. McCoy as metallurgist for Texas Electric Steel Casting Co., has been announced by Thomas H. Shartle, president. Before accepting his new position with Tesco, McCoy was chief metallurgist for Ohio Steel Foundry Co., at Lima, Ohio. The broad experience which he gained there, in a diversity of types of castings, but especially in the casting of armor to rigid metallurgical specifications, will be of great value, in his new position.

Since his graduation as a chemical engineer from Western Reserve University, McCoy has held responsible positions in several of the largest and more progressive steel foundries in the East and Midwest. Aside from his years of practical foundry experience, he has taken postgraduate work in metallography and heat treating of iron and steel at Case School of Applied Science.

Republic Supply Announces Several Personnel Changes

Harry B. Catlow, president of Republic Supply Co., has announced several personnel and organizational changes. Republic's district No. 2, which formerly included the Texas and Louisiana Gulf Coast area, will be split into three parts.

H. C. Kinney, manager of district No. 2, will move his headquarters from Houston to San Antonio. This district will now include the following stores: Corpus Christi, Alice, Hebbronville, McAllen, Pleasanton, Falfurrias, and Victoria, Tex.

Under the new arrangement, the City of Houston and surrounding trade territory will become the Houston district sales office and will be under the management of Ralph B. Harp.

Republic's New Iberia and Lake Charles, La., stores which were formerly a part of district No. 2 will be under the supervision of W. M. Haynes, in addition to his duties as manager of refinery and industrial sales for the home office of Republic Supply.

"The purpose of these changes,"

(Continued on page 127)

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

CLASSIFIED ADVERTISING

UNDISPLAYED CLASSIFIED 12c a word one issue. 10% Discount three or more issues. $3.00 minimum charge. Blind Box in our care counts nine words. Payable in Advance.

DISPLAY CLASSIFIED
$12.00 a column inch one issue . . .
10% Discount three or more issues.

EQUIPMENT FOR SALE

ROLAGRIP COUPLINGS—For Sale, 100 tons, 1½" to 8" inclusive. New, never used complete with bolts and neoprene gaskets. Price 50% less than manufacturers selling price. Send for list. JULIUS M. FOGELMAN, Reading, Pa.

FOR SALE: Approximately 15,000 feet of 6" OD "Invasion" Steel Pipe, Wt. about 9#, 6⅝" OD Plain Ends, 20' lengths. New condition. Also, approximately 15,000 feet of 6⅝" OD Plain End Stand Black Steel Pipe, No. 2 Grade. M. KAPLAN & SON, Box 1883, Phone 942, Monroe, Louisiana.

FOR SALE at Bartlesville, one slightly used Addressograph Graphotype Model #6253. Hand operated with 110 volt motor drive. $450.00. Cities Service Oil Co., Patridge, Bartlesville, Okla.

NEW Byron Jackson "Pup" Centrifugal Pumping Units with Chrysler Ind-S engines — Army surplus — export boxed with parts and tools—condition perfect—supply limited—price attractive—available for immediate shipment from Houston.

HALLORAN EQUIPMENT CO.
431 Kress Bldg. Ph. CA-1447
Houston 2, Texas

FOR SALE

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

FOR SALE

4—250 bbl. 4—500 bbl. low type
4—1,000 bbl. high type 4—1,500 bbl.
3—5,000 bbl. 5—10,000 bbl.

All NEW closed A.P.I. bolted type steel tanks

4—NEW closed welded steel tanks 7'6" dia. x 13'6" long, 5/16" shell, ¾" bulged heads

3—NEW vertical welded steel tanks with welded stands, 4'8" dia. x 18'8" high, 1½" thickness, bulged heads

16—Used horizontal welded steel tanks 8' dia. x 30' long, ¼" thickness, approx. 12,000 gal.

20—Used vertical welded steel tanks, like glass enameled inside, 10'4" dia. x 17'4" high, ⅜" shell, dished heads

100—Used closed vertical Cypress WOOD tanks, approx. 10' diameter, from 8' to 18' high, complete with round hoops and lugs

We carry large quantities in stock for immediate shipment of New and Guaranteed Used steel PIPE and TUBING up to 30" in diameter.

Your inquiries will be appreciated.

A. GREENSPON PIPE CO., Inc.
3615 Olive St. St. Louis 8, Mo.
LUcas 5651

EQUIPMENT FOR SALE

FOR SALE: 3,000 Ft. 10¾" O.D. 32#; 6,000 Ft. 8⅝" O.D. 24#; 4,000 Ft. 7" O.D. 20#; 10,000 Ft. 7" O.D. 17#; 14,000 Ft. 5½" O.D. 14#; 20,000 Ft. 2" tubing 4.6#; 50,000 Ft. 2" line pipe 4#. All of this pipe is exceptionally good quality used lapweld. Priced very reasonably. Can be inspected at Marietta. The Interstate Pipe & Supply Company, Marietta, Ohio. Phone 2468.

FOR SALE: Two Fairbanks-Morse Diesel Engines, 150 H.P. Twin Cylinder, Horizontal Type. Completely overhauled. $1500.00 each Melton Supply Co., Seminole, Okla.

Several Army Surplus 4½" x 6" Gaso Duplex 1860 Pumps — two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

H. H. COFFIELD
ATTN: W. H. Orr
Phones: 132—Rockdale, Texas
A-86084—Houston, Texas

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE in the Seminole Field, 2—10 x 40' Horizontal Riveted Gasolene Storage Tanks. Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

FOR SALE

8000' CAPACITY ROTARY RIG

Unit Rig U-15 Draw works; powered by two Waukesha NKU 225 H.P. Motors; National C-250 Pump; Bethlehem 150-T Swivel; 4200 B-J Triplex Hook; Type A-250 Gumbo Buster Traveling Block; 17½" Gumbo Buster Rotary Table; Thompson LR Shale Shaker; 5000' new 4½" Drill Pipe; 3000' #2 4½" Drill Pipe. Complete Rig in excellent condition.

J. F. SMITH
302 Masonic Bldg., Shawnee, Oklahoma
Phone L.D. 33

FOR SALE

5,600'—8⅝" O.D. 28# Lapweld T&C, Range 1
90,000'—6⅝" O.D. 17.65# Seamless, Range 3, Beveled
60,000'—6⅝" O.D. 19.79# Lapweld, T&C
80,000'—6" O.D. 9# New Invasion Pipe, Coated & Wrapped, range 3 tested 500# W.P. Beveled.
2—55,000 Bbl. All Steel Welded Tanks
1—80,000 Bbl. All Steel Welded
1—55,000 Bbl. All Steel Riveted
Sell cut down or standing, Located Longview, Tex.

W. C. BERRY
Box 1858 Tulsa, Oklahoma Phone 3-6141

SPECIAL OFFERING 8640 STEEL ROUNDS

QUANTITY: 1637 Net Tons

SIZES: 1149 Ton 4½" x 131"
143 Ton 6⅛" x 95"
345 Ton 7½" x 87"

POTENTIAL USES: **Forging Billets,**
Mechanical Tubing, Hot Finished or Cold Drawn to Diameters 4½" to 8⅝", Wall Thickness Range ¼" to ½"
Oil Country Casing, 5½" 17#; 7" 23#; 8⅝" 32# Range 2
Yield 95,000# Minimum as against N80—80,000#

DELIVERY: Billets—Immediate
Alloy Mechanical Tubing or Oil Country Casing—Fast Shipment

MILL LOCATION: Pittsburgh District

PURCHASING DEPARTMENT
DRESSER INDUSTRIES, INC.
1130 Terminal Tower, Cleveland 13, Ohio, Telephone: TOwer 1-7600

EQUIPMENT FOR SALE

FOR SALE: We have just shut down the chemical portion of our gasoline-chemical plant in the Sasakwa Field and have available five 170 hp. Type 80 Cooper Twin Engine Compressor Units. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE

1-D-40 International Truck with Model UM4 Cooper Skid Winch for pulling rods and tubing.

1-K-7 International Truck with Model UM4 Cooper Skid Winch complete with tools for pulling rods and tubing.

DEEP ROCK OIL CORPORATION
Drumright, Oklahoma

Dismantling Complete Refinery

FOR SALE

Any and all parts of the Carter Oil Refinery at Billings, Montana.

Wire, Write or Call

PEPCARR COMPANY
Billings 92180

FOR SALE
10" PIPE

50,000'—10¾" O.D., 40.48#, 20' random, plain end, beveled for welding.

This pipe is secondhand in excellent condition and can be used as is for line pipe or we will thread for casing.

Horwitz Pipe & Steel Company

415 S. Western 2-7591
Oklahoma City, Oklahoma

WATCH THIS SPACE FOR OUTSTANDING WEEKLY VALUES

BOILERS

3—1000 HP, Vogt, class VR, bent tube, water tube boilers, 300 lb. PSI, capacity 60,000 lbs. steam per hour, complete with Foster-Wheeler superheater, natural gas fired, ASME code. Used less than 2 years after installation in 1943.

2—800 HP, Babcock & Wilcox, integral furnace, type FF-16-44, water tube boilers, 200 lbs. PSI, capacity 54,000 lbs. steam per hour, natural gas fired, forced draft. Each boiler equipped with B. F. Sturtevant, size 100, design 7, class III, fans. Driven by Worthington-Moore steam turbine. Used less than 2 months after installation in 1946.

DULIEN STEEL PRODUCTS, INC.
of Washington
P. O. BOX 667
COTTON VALLEY, LA.
PHONE: COTTON VALLEY 26

EQUIPMENT FOR SALE

FOR SALE: 1—36-L Bucyrus Rig, 1948 model, complete with all tools. Phone 2032, Henderson, Kentucky.

MUD hog pump 7¾ x 12 Gardner-Denver, mud hose, Fairbanks-Morse water pump, Wrenches, hand tools, etc., all at Wichita Falls. D. F. MacKinnon, 3200 Main Street, Dallas, Phone C-6415.

FOR SALE: Two steel mud tanks, 5 feet by 8 feet; 30 feet long, made of ¼" steel, sloping bottom. Never been used. $3200. Located Makin Drilling Company's yard, Hobbs, New Mexico.

EQUIPMENT: New and used spudders, rotaries, core drills; cable tools, drill pipe, PK rods. Everything for well service. We rent fishing tools. Pressey & Son, Pueblo, Colorado.

K—CARDWELL RIG

In good shape—complete with roof wind breakers, steel dog house, 4 cylinder Kohelier Lite Plant—2 strings of tools, tubing tools—$10,000.00.

JOE L. BYRD
Box 246, Fairfield, Ill.
Phone 537 RX

STEEL STORAGE TANKS

Railroad Tank Car Tanks. 6,500 to 12,000-Gal. Cap. Coiled and Non-Coiled

Cleaned—Painted—Tested
Heavier—Safer—Cheaper
Other Tanks, Too.

Also — Complete Tank Cars 8,000 and 10,000-Gal. Cap.

Your Inquiries Solicited

NEWHALL-MARSHALL-WOOD, INC.

30 Church Street New York 7, N. Y.
Phone: COrtlandt 7-8090

IDEAL FOR GAS LINES

Reconditioned

SEAMLESS TUBING

21,000 ft. 5½" OD
55,000 ft. 4" OD
75,000 ft. 3¼" OD
55,000 ft. 2¼" OD
120,000 ft. 2" OD
95,000 ft. 1½" OD
Single or double random lengths

Also New 4" OD Seamless
BOILER TUBES
available 20,000 feet.
20-22 Random lengths, plain ends, beveled for welding.

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-554)
Kansas City 18, Kansas THatcher 9243

EQUIPMENT WANTED

WANTED: Two Sweetland Presses; Size #3 to 7 inclusive. Also, Oil Canner. Oklahoma Refining Company, Box 1265, Seminole, Oklahoma.

SERVICES

LET us help you locate your oil wells. Our scientifically instrumentation survey will show you where there is oil, outline complete pools, number of pays, etc. Most positive results; let us prove it to you. Don't waste your money on dry holes. Our services are reasonable. Breuer Bros., Sheridan, Ill.

HELP WANTED

WANTED—Petroleum engineer with production and well completion experience in Texas and other states, capable of handling all drilling and development problems of small but aggressive company. Please give complete data and references in first letter. Box D-335, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Geologist with major company experience, for general work in Mid-Continent area, Tulsa headquarters. State age, experience and salary expected. Address: P. O. 1743, Tulsa, Oklahoma.

NEW foreign and domestic Oil Employment Directory. Over 500 listings in drilling, production, refining, natural gasoline, pipe lines, geological, exploration, supplies, manufacturers, services; and trucking, refinery and pipe line contractors, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla. (Our 28th year).

WANTED: Mechanical design engineer and draftsman with minimum three years' experience oil refinery piping engineering. Engineering degree preferred. Permanent positions for qualified men. Give complete review experience record with application. Address E. M. Skinner, Chief Engineer, Socony-Vacuum Oil Co., Inc., Augusta, Kansas.

JUNIOR ENGINEER wanted by independent oil company operating in West and West Central Texas. Must be recent graduate with petroleum engineering degree. All replies should contain outline of training, past experience, if any, age, marital status, date of availability, and starting salary desired. Recent photo or snapshot would be helpful. Address Box D-342, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS, Executives, Technical Men. Salaried positions — $3600 to $30,000. This confidential service for outstanding men who desire a change of connection, will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 1204 Berger Bldg., Pittsburgh 19, Pa.

EXPERIENCED gravity personnel for foreign work, party chiefs, surveyors, and operators. All expenses. The best opportunity in the industry to make money and advance. Exploration Surveys, Inc., 3615 Daniels Avenue, Dallas 6, Texas.

PETROLEUM ENGINEER with production and drilling experience in Mid-Continent Area; age 28 to 35. Must have at least three years' field experience. In replying state educational background, past employment record and salary expected. All replies handled in strict confidence. Box D-350, The Oil and Gas Journal, Tulsa, Oklahoma.

AGENTS WANTED: Reputable, established manufacturer of seamless and welded steel tubing and tubular products would like agents in the following trade areas: Buffalo, Pittsburgh, Cincinnati, Dayton, Birmingham, Chattanooga, Kansas City, Omaha, Memphis, Little Rock, New Orleans, and Mobile. Commission basis. Would prefer agents located and known in the area. Give complete, accurate details when applying. Box D-348, The Oil and Gas Journal, Tulsa, Oklahoma.

ALL around practical refinery engineer for number two man U. S. company in British Colony. U. S. dollars salary, to assist Manager in supervision of terminal and small refinery, general camp duties, excellent future, replies held confidential. Box D-353, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

PETROLEUM ENGINEER: Graduate, single, 24, desires position in production field. Year's experience as junior engineer in production work, Venezuela. Good references. Box D-345, The Oil and Gas Journal, Tulsa, Oklahoma.

INSTRUMENT SUPERVISOR: Ten years experience maintenance of refinery and powerhouse installations. Familiar with fluid catalytic cracking and modern construction practices. Now employed. Prefer Rocky Mountain area. Box D-351, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, B.S., 3½ yrs. subsurface experience in Cuba and Venezuela, desires a position with aggressive company, preferably domestic. Box D-308, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

AVAILABLE March 1, 1950. Mechanical Supt., Master Mechanic, or Service and Erection Engineer. Age 35, 2 years Mechanical Engineering plus 12 years' experience, in refinery, chemical, gasoline, compressor and power house installations to 90,000 KW. Box D-343, The Oil and Gas Journal, Tulsa, Oklahoma.

DESIRES CHANGE—Experienced in all phases of natural gas industry including recycling plant supervision and operation. Age 38, 15 years' experience. 1½ years college with 3 years' extension study in Chemical Engineering. Excellent references. Desires supervision of gasoline recycling plant. Box D-347, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico Personal interview by appointment is desired. Makin Drilling Company, Box No 131, Ph. No. 131, Hobbs, New Mexico

TAX ACCOUNTANT—Under 35. Desires connection in South or Southwest. Five years specialized training and experience handling federal and state income and excise tax accounting for large producing company. University accounting education. Box D-346, The Oil and Gas Journal, Tulsa, Oklahoma.

Refinery Technologist

"Jack-of-all-trades" (But MASTER of some). 15 years of broadly diversified refinery process engineering, from alkylation and cat-cracking to waste disposal and yield-analysis. Just concluded major assignment as engineer in charge of a $15,000,000 complete lube plant project, including selection of processes and contractors, design, economics, and initial operation ending in present successful commercial operation. Age 37, family man, health excellent.

Worth salary required only if you need unusual ability. For details write

Box D-352, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASE AND DRILLING BLOCKS

SEE A. L. BOWLES, ADA, OKLA., FOR DRILLING DEALS, LEASES, ROYALTIES

SCURRY COUNTY ROYALTIES

Send for list of choice Scurry County royalties. Also have few townsite lot leases $300. Navarro Royalties Company, Odessa, Texas.

17,000 ACRES, Great San Juan Basin, New Mexico. 10-year lease, 25c rentals. Ideally located. $1.75 acre. Small Oil Payment. Inquiry invited. Box D-349, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASES ROYALTIES

Producing and Nonproducing

Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY

6378 Clayton Road, St. Louis 17, Mo

NORTH DAKOTA MINERALS AND LEASES

Bought direct for you on your purchase order. My lease block map and reprint of press and magazine articles clearly outlining this play mailed on request.

(Purchase orders accepted only from those connected with the oil industry or royalty business.)

Wire, Write or Call

JOHN ALLEN

Suite 200, Grand Pacific Hotel

Bismarck, North Dakota

(Member National Oil Scouts and Land men Association. References exchanged.)

LEASE AND DRILLING BLOCKS

FOR SALE: Oil and Gas Leases and drilling propositions in shallow territory of Allen, Simpson, and Warren Counties, Kentucky. W. P. Harley, Bowling Green, Kentucky.

SELL oil and gas lease near deep and shallow production. 200 acres section 9, 1 north, 5 west, Stephens County, Hattie Harrell, Phone 931 East Highway, Duncan, Oklahoma.

FOR SALE: 320-acre 10-year lease, E½ Sec-89, Blk-DD, Terry County, Texas, near proposed Ellenburger test. Call 3-1531, A. J. Welborn, 3318 27th St., Lubbock, Tex.

TO FARM OUT

400 acres near LaCygne, Kansas; 60 miles south of Kansas City; 10 shallow production on ⅛ override interest.

Write MABES CO., Agents

Commerce Bldg., Kansas City, Missouri

WANTED

GOOD Oil Leases in Scurry County, Texas, and adjoining counties. Will drill immediately. Send sketch or map and full information to:

Box D-340

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

WILL DRILL ON PROVEN ACREAGE

Send FULL information at once to:

Box D-339

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

OIL

NOTICE is given of a Trustee's Sale at public auction for cash on January 24, 1950, at 2:00 P.M. at East Door of Court House in Oklahoma City of 13 16ths of minerals in SW¼ of 5-14N, R 4W, and 11 16ths of minerals in W½ of NW¼ of 8-14N-R 4W, in Oklahoma County producing about $600.00 in oil per month. Also the 240 acres real estate will be sold. If interested, write A. L. Hilpirt, Trustee, 410 Hightower Bldg., Oklahoma City, or phone 3-1405, Oklahoma City.

PRODUCTION FOR SALE

FOR SALE: One well, pumping and flowing, with 28 feet of oil sand; fifteen additional drilling locations. First well 25 to 35 bbl. 40 gravity; less than 2,000 feet. New equipment, electrically operated. P. O. Box 26, Tulsa, Oklahoma.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations. Commercial Printing, Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa 3, Oklahoma.

ROYALTIES

SPOT CASH for PRODUCING ROYALTIES
GERBER & COMPANY (Est. 1934)
120 WALL STREET, NEW YORK, N. Y.

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

MONTANA ROYALTIES

Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225, Great Falls, Montana.

Equipment Men

(Continued from page 124)

Catlow said, "is to permit closer supervision and operation of our stores. The expansion of the petroleum and chemical industries in the Gulf Coast area, as well as increased drilling operations, make it necessary that we keep abreast of the constantly changing picture."

At the same time, Catlow announced the creation of the Repsco seal division of the refinery and industrial sales department, which will be under the management of Frank Sparks. The Repsco rotary shaft seal is manufactured and distributed by Republic Supply Co.

Sonoflux Names Humphrey As General Manager

With the appointment of Robert L. Humphrey as vice president and general manager, Sonoflux Corp. of Houston has begun marketing its new portable vibromagnetic inspection unit, the Sonoflux. This instrument will be marketed throughout the United States as well as in foreign markets. The present model is designed for use on rigs to inspect tools and equipment.

Humphrey brings a wide background in sales, advertising, and organization development to the new company, and, in addition, he has a keen understanding of drilling and production problems.

Miller Made Assistant Sales Manager for Norris

Arthur Miller, Jr., has been appointed assistant sales manager for W. C. Norris, Manufacturer, Inc., Tulsa. Miller joined the pioneer oil - field - equipment manufacturer in January 1936, and worked in the shop and warehouse. From December 1938 until September 1942 he was at St. Elmo and Mount Carmel, Ill., as warehouseman, store manager, and field salesman.

After serving in the United States armed forces, he rejoined Norris in 1945 as a field man covering East Texas, southern Arkansas, Louisiana, and Mississippi. In 1947 he returned to the Tulsa office and remained as a city salesman until his appointment to the new sales post.

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CALENDAR

February

Southern Gas Association, meter and regulator conference, Houston, February 9-10.

American Institute of Mining and Metallurgical Engineers, annual meeting, Hotel Statler, New York, February 12-16.

Western Petroleum Refiners Association, regional technical meeting, Washington-Youree Hotel, Shreveport, February 24.

American Institute of Chemical Engineers, regional meeting, Houston, February 26-March 1.

American Society for Testing Materials, spring meeting, Hotel William Penn, Pittsburgh, February 27-March 3.

March

American Petroleum Institute, Division of Production, Southwestern District meeting, Adolphus Hotel, Dallas, March 8-10.

Indiana Independent Petroleum Association, spring convention, Hotel Severin, Indianapolis, March 9-10.

North Texas Oil and Gas Association, Kemp Hotel, Wichita Falls, March 25.

Southern Gas Association, Galveston, Tex., March 27-29.

Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, March 27-29.

American Petroleum Institute, Division of Production, Mid-Continent district meeting, Skirvin Hotel, Oklahoma City, March 29-31.

April

National Association of Corrosion Engineers, annual conference, Jefferson Hotel, St. Louis, Mo., April 4-7.

American Society of Mechanical Engineers, Hotel Statler, Washington, D. C., April 10-14.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, Okla., April 11-13.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 12-14.

American Petroleum Institute, Division of Production, Rocky Mountain district meeting, Gladstone Hotel, Casper, Wyo., April 13-14.

Natural Gasoline Association of America, annual convention, Texas Hotel, Fort Worth, April 24-26.

Oil Heat Institute of America and National Oil Heat Exposition, annual meeting, Commercial Museum, Philadelphia, April 24-May 1.

American Petroleum Institute, Division of Production, eastern district meeting, Cleveland Hotel, Cleveland, April 26-28.

May

American Petroleum Institute, Division of Refining, midyear meeting, Hotel Cleveland, Cleveland, May 1-4.

Interstate Oil Compact Commission, spring meeting, Biloxi, Miss., May 4-6.

Independent Petroleum Association of America, midyear meeting, Biltmore Hotel, Los Angeles, May 7-9.

National Stripper Well Association, Biltmore Hotel, Los Angeles, May 7-9.

American Gas Association, Natural Gas Department, spring meeting, Mayo Hotel, Tulsa, May 8-9.

Liquefied Petroleum Gas Association, annual convention, Palmer House, Chicago, May 8-11.

American Petroleum Institute, Division of Production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles, May 11-12.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 22-24.

American Institute of Chemical Engineers, regional meeting, New Ocean House, Swampscott, Mass., May 28-31.

June

National Oil Scouts and Landmen's Association, Skirvin Tower Hotel, Oklahoma City, June 8-10.

American Society of Mechanical Engineers, oil and gas power division, Lord Baltimore Hotel, Baltimore, June 12-16.

Pennsylvania Grade Crude Oil Association, Hotel William Penn, Pittsburgh, Pa., June 15-16.

American Society of Mechanical Engineers, Hotel Statler, St. Louis, June 19-23.

Canadian Gas Association, annual convention, Manior Richelieu Hotel, Murray, Quebec, Canada, June 20-24.

American Petroleum Institute, midyear division of production and standardization conference, Brown Palace Hotel, Denver, June 26-30.

American Society for Testing Materials, annual meeting Chalfonte-Haddon Hall, Atlantic City, N. J., June 26-30.

August

Interstate Oil Compact Commission, summer meeting, French Lick, Ind., August 3-5.

September

American Society of Mechanical Engineers and Instrument Society of America, Municipal Auditorium, Buffalo, N. Y., September 11-15.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 13-15.

American Society of Mechanical Engineers, petroleum mechanical engineering conference, Roosevelt Hotel, New Orleans, September 25-27.

October

American Gas Association, annual convention, Atlantic City, N. J., October 2-6.

Mid-Continent Oil and Gas Association, Texas division, Dallas, October 4-5.

American Association of Oilwell Drilling Contractors, annual meeting Mayo Hotel, Tulsa, October 9-10.

November

American Petroleum Institute, annual meeting, Biltmore and Ambassador Hotels, Los Angeles, November 13-16.

American Society of Mechanical Engineers, Hotel Statler, New York, November 26-December 1.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas Nomads, first Monday of each month, Texas Room, Baker Hotel.

Houston Nomads, second Monday of each month. Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that two units of land containing in all 280 acres in T. 32 N., R. 19 E., P.M., Montana, within the known geologic structure of the North Bowes field, will be offered for oil and gas leasing, through competitive bidding, at 1 p. m. on February 1, 1950, when bids will be open. The details of the lease offering, how and where to file bids, and a description of the lands may be obtained by addressing an inquiry to the Manager at the District Land Office, at Billings, Montana, or to this office. Marion Clawson, Director.

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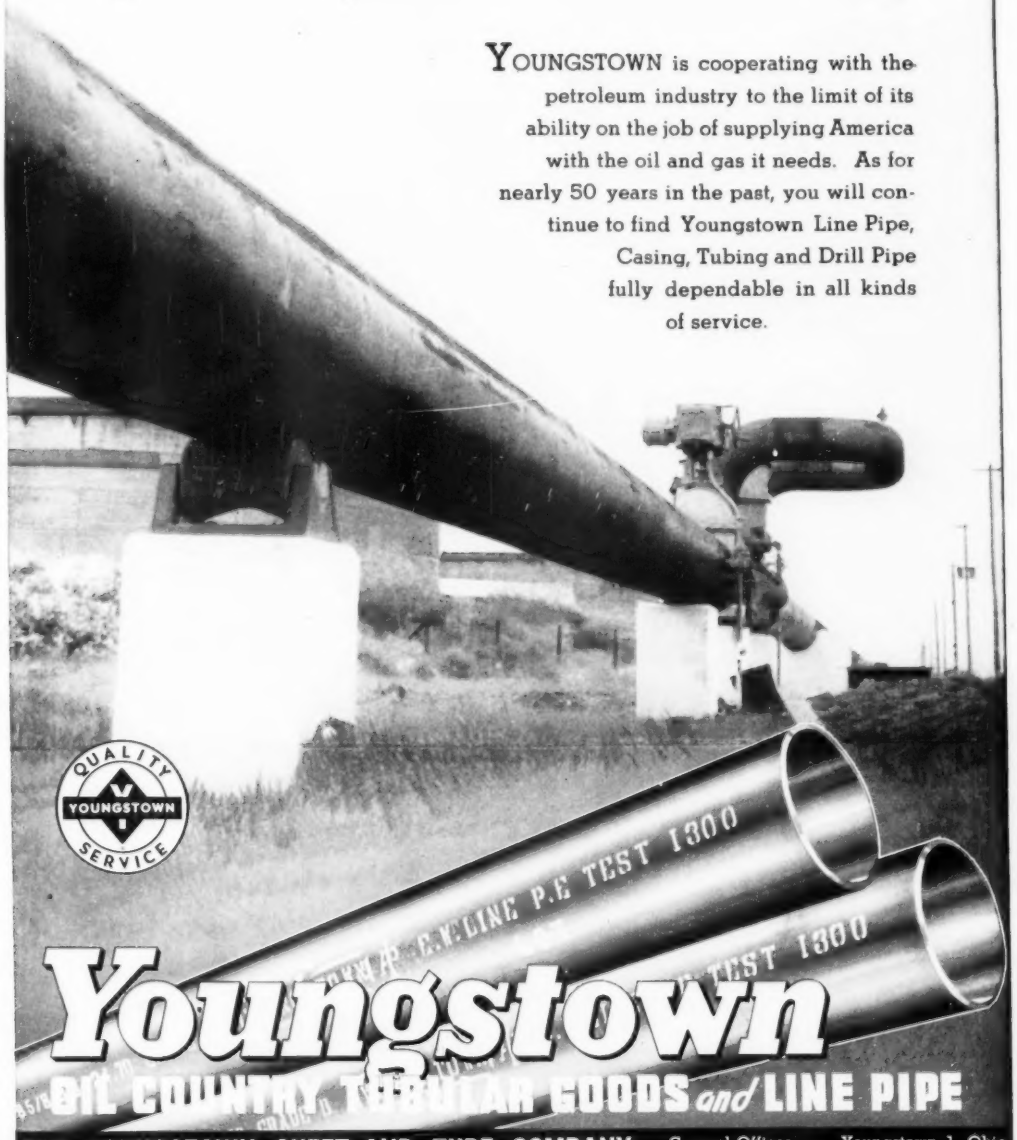

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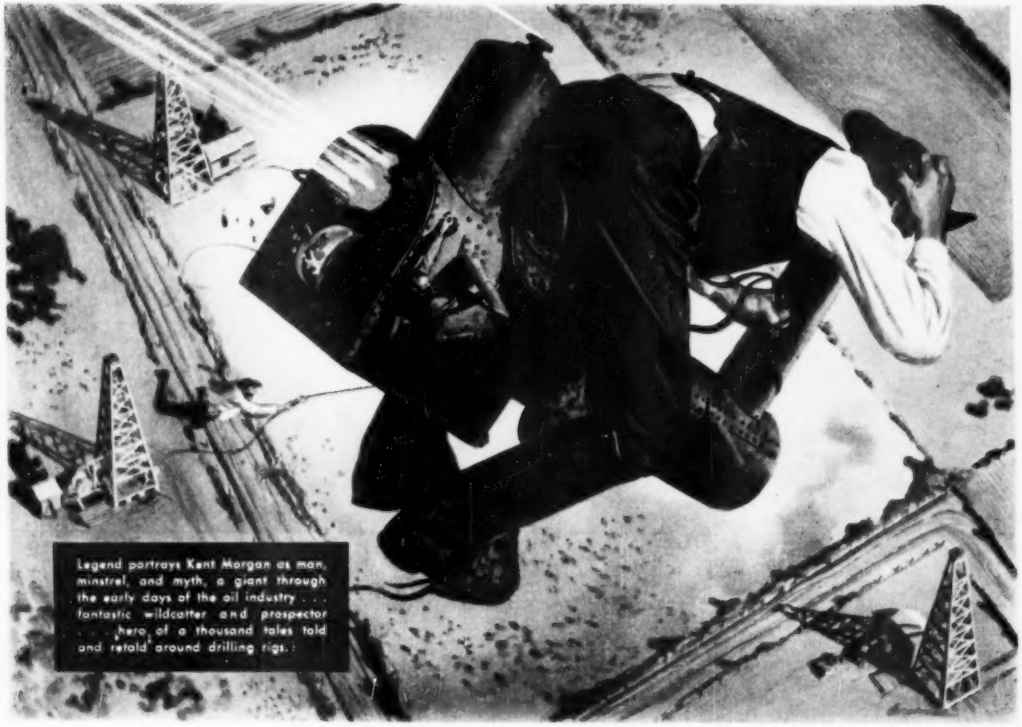
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